Radiocarbon Chronology of the Inca Expansion in Argentina*

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Abstract: The purpose of this article is to broaden the information available on the chronology of the Inca expansion in Collasuyu by analyzing all radiocarbon dates obtained in Argentina's Inca sites. We evaluated and classified all the dates (n=178) into three different groups (G1, G2, and G3), according to the quantity and quality of contextual information, and the possibility of effectively

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verifying this information through published articles. The interpretation was mainly based on the dates showing the best information regarding the origin and context of the samples (28 of the G1, and 36 of the G2). Our results indicate that the Inca advance started towards the beginnings of 15th Century AD in the northernmost part of Argentina and rapidly continued southwards, probably reaching the province of Mendoza some 50 years later. This study confirms the differences between the ethnohistoric chronology and the radiocarbon data, previously pointed out by other authors. Moreover, it suggests a sequence of at least three stages in which the Incas would have incorporated the existing territories until *ca*. 24°, 28°, and 34° 30' S, respectively. This is the first global study of Inca chronology in Argentina, and the first time that dates are classified to determine their level of context information and reliability.

Keywords: Center-west Argentina, Collasuyu, Inca chronology, Inca domination, northwest Argentina, radiocarbon dates.

Cronología radiocarbónica de la expansión incaica en Argentina

Resumen: la finalidad de este artículo es contribuir al conocimiento sobre la cronología de la expansión incaica en el Collasuyu, mediante el análisis de todas las dataciones radiocarbónicas publicadas de sitios incaicos en Argentina. Evaluamos y clasificamos todas las fechas (n = 178), en tres grupos diferentes (G1, G2 y G3), de acuerdo con la cantidad y calidad de la información contextual, y con la posibilidad de verificarla, de manera efectiva, a través de los artículos publicados. La interpretación se basó principalmente en las fechas que revelan la mejor información sobre el origen y el contexto de las muestras (28 del G1 y 36 del G2). Nuestros resultados indican que el avance incaico comenzó a principios del siglo XV d. C., en el extremo norte de Argentina, y que culminó unos cincuenta años después en la provincia de Mendoza. Este estudio confirma las diferencias entre las dataciones radiocarbónicas y las fechas etnohistóricas previamente señaladas por otros autores. Además, sugiere una secuencia de al menos tres etapas en las que los incas habrían incorporado los territorios existentes hasta *ca*. 24°, 28° y 34° 30' S, respectivamente. Este es el primer estudio global sobre la cronología inca en Argentina, y es la primera vez que las fechas son clasificadas y utilizadas según su nivel de información, contexto y confiabilidad.

Palabras clave: centro-oeste argentino, Collasuyu, cronología incaica, dominio inca, fechados radiocarbónicos, noroeste argentino.

Cronologia de radiocarbono da expansão inca na Argentina

Resumo: o objetivo deste artigo é contribuir para o conhecimento da cronologia da expansão inca no Collasuyu, analisando todas as datações de radiocarbono publicadas de sítios incas na Argentina. Avaliamos e classificamos todas as datas (n = 178) em três grupos distintos (G1, G2 e G3) de acordo com a quantidade e qualidade das informações contextuais e com a possibilidade de sua

verificação efetiva pelos artigos publicados. A interpretação baseou-se principalmente nas datas que apresentam as melhores informações sobre a origem e contexto das amostras (28 do G1 e 36 do G2). Nossos resultados indicam que o avanço inca começou no início do século XV d.C., no extremo norte da Argentina e culminou cerca de 50 anos depois na província de Mendoza. Este estudo confirma as diferenças entre a datação por radiocarbono e datas etno-históricas, previamente indicadas por outros autores. Além disso, sugere uma sequência de pelo menos três etapas nas quais os Incas teriam incorporado os territórios existentes até *ca*. 24°, 28° e 34° 30' S, respectivamente. Este é o primeiro estudo global da cronologia inca na Argentina e é a primeira vez que as datas são classificadas e utilizadas de acordo com seu nível de informação de contexto e confiabilidade.

Palavras-chave: centro-oeste da Argentina, Collasuyu, cronologia inca, datação por radiocarbono, domínio inca, noroeste da Argentina.

The Inca state was the most extensive prehispanic political unit in South America, spanning from Colombia to central Chile and Argentina. Its development involved the control of various territories and ethnic groups, within a multifaceted process whose chronology and dynamics are not yet well known. For Collasuyu, the southern region of the empire, the idea of a very rapid, homogeneous, and late expansion dating back to the reign of Topa Inca Yupanqui, after 1471 AD prevailed for several decades. This vision was based on a documentary analysis carried out during the mid-20th century by Rowe (1945). In recent decades, with the advancement of studies and dating techniques, archaeologists began to question this chronology (e.g., Adamska and Michczyński, 1996; Cornejo 2014; D'Altroy *et al*. 2007; Marsh *et al*. 2017; Meyers, 2016; Ogburn 2012; Raffino and Stehberg 1999; Schiacappasse 1999; Williams and D'Altroy 1998) and to recognize a significant variability in the strategies used to expand and consolidate the Inca territorial domain (Malpass and Alconini 2010). At present, there is widespread consensus on the need to reconsider the dates provided by ethnohistoric studies and to develop a chronological framework that allows a better understanding of the profound and diverse impact of Inca control in the area.

In Argentina, this interest has been accompanied by a significant increase in research focusing on the Inca domination of the region and on obtaining new radiocarbon dates. Some proposals have also been put forward regarding the time in which some territories were incorporated to the Tawantinsuyu (e.g., Marsh *et al*. 2017; Nielsen 1997), but the extent of these studies is partial. Thus, faced with the need to analyze the chronology of the Inca's expansive – and possibly fragmentary – process in the region with a global panorama, in this paper, we look at all published ^{14}C dates from northwest and center-west Argentina. Nevertheless, the discussion revolves around the dates corresponding to samples with detailed contextual information, which increases the possibilities of confirming that association with an event in the Inca period is correct. This, in turn, ensures the

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greater reliability of the chronological estimations of the development of this expansive process in each one of the areas involved.

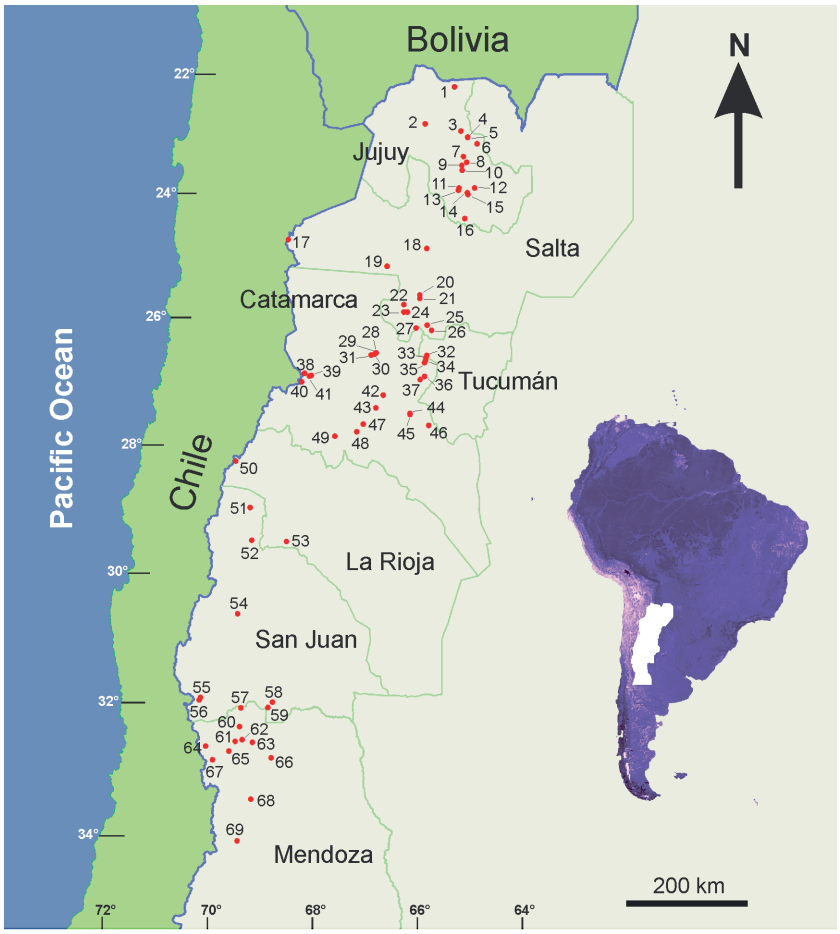
Methodology and Samples

For the current study, we considered every ^{14}C date explicitly attributed to the Inca domination that was adequately published with the corresponding laboratory code. The sample consists of 178 dates from 76 archaeological sites distributed in seven provinces in Argentina: Jujuy, Salta, Tucumán, Catamarca, La Rioja, San Juan, and Mendoza (Figure 1). All of them come from archaeological contexts without materials of Spanish Colonial origin. These dates were calibrated with the Southern Hemisphere curve of the Calib7 software (Hogg *et al*. 2013; Stuiver and Reimer 1993) and, for the analysis, we considered the periods that were within two standard deviations.

The obstacles limiting the precision of radiocarbon dating corresponding to short and recent periods are widely known. Among these, we must include the error margin in dates, the diversity of analyzed materials and conditions in the processing of the samples, as well as the post-depositional alterations of contexts and/or samples (Cornejo 2014; Meyers 2016). Accordingly, we agree to approach this subject in terms of time periods and not of specific dates, even though we propose estimated years for the annexation of each sector of Tawantinsuyu. Given the fact that the extension of the calibrated ranges exceeds the period of analysis, and the fact that all the dates used correspond to Inca contexts that did not include Colonial elements, to interpret the data, we considered the average dates from the main distribution areas with two standard deviations (95 % probability), and only in some cases (dates from San Juan), with one standard deviation (68 % probability). Even when we acknowledge that probability distributions are not symmetrical and that the midpoints are not necessarily the dates of highest probabilities, we think that they offer fairly proximate and acceptable alternatives with which to handle the information obtained.

The quality of a ^{14}C date depends on the degree of confidence in the archaeological context from which a sample is recovered, on the purity of the analyzed material and on the precision of the analytical method (Boaretto 2009). It is therefore necessary to consider whether every date linked to the problem approached here (in this case, the chronological frame of the Inca expansion) presents the same degree of confidence, since those with a high degree of uncertainty should not be considered. Do all ^{14}C dates considered Inca dates really correspond to materials or events of that period? In order to assess the reliability of a date, several authors have proposed to rate the degree of confidence in the association between the material sample and the archaeological record or the event involved (e.g., Greco 2012; Taylor 1987; Waterbolk 1971). However, many articles fail to offer the information required about the contexts. So, as an alternative, this study considers three groups of dates, defined by the quantity and quality of the available contextual information for each sample and the possibility of verifying the cultural assignation proposed by each researcher.

Figure 1. Location of the main archaeological sites mentioned in the text



1. Cerro Colorado Sitio 1; 2. Doncellas; 3. Pintoscayoc 1; 4. Putuquito; 5. Juire; 6. Puerta de Zenta; 7. Los Amarillos; 8. La Huerta; 9. Juella; 10. Pucará de Tilcara; 11. Esquina de Huajra; 12. Pucará de Volcán; 13. Cucho de Ocloyas; 14. La Bolsa; 15. AP1; 16. Agua Hedionda; 17. Cerro Llullaillaco; 18. Potrero de Payogasta; 19. Abra de Minas; 20. Tambo Angastaco; 21. Pucará de Angastaco; 22. Fuerte Gualfín; 23. Compuel Finca; 24. Corralito V; 25. El Divisadero; 26. Tolombón; 27. Nevado de Chuscha; 28. Festejo de los Indios; 29. Aldea Piedra Negra; 30. Caranchi Tambo; 31. IA01; 32. El Paso; 33. Fuerte Quemado-El Calvario; 34. Las Mojarras 1-Augier; 35. Rincón Chico 14; 36. Ampajango 2; 37. Punta de Balasto; 38. San Francisco 04; 39. Form. Rocosa Las Grutas; 40. Las Cuevas 1; 41. Fiambalá 1; 42. Hualfín- Inka; 43. Quillay Huayras; 44. Agua Verde; 45. Potrero Chaquiago; 46. Pucará de Aconquija; 47. El Shincal de Quimivil; 48. Tambillo Nuevo; 49. Batungasta; 50. Tambo La Ollita; 51. Santa Rosa; 52. Alcaparrosa; 53. Guandacol; 54. Tocota; 55. Pircas Indias; 56. Mercedario; 57. Yalguaraz; 58. Pedernal-Sitio2; 59. El Acequión; 60. Tambillos; 61. Ranchillos; 62. Potrero Las Colonias; 63. Agua de la Cueva; 64. Aconcagua; 65. Tambillitos; 66. Odisa; 67. Penitentes; 68. Agua Amarga; 69. Alero Ernesto.

Source: Alejandro García, 2020.

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For the dates in Group 1 (G1), detailed descriptions are provided for the location of the dated sample, the archaeological register of the dated context, its stratigraphic distribution and spatial relation with the sample. This is done so that the composition of the contexts can be reconstructed in order to verify the association with the sample and its Inca character. For dates in Group 2 (G2), the excavation, stratigraphy, and archaeological materials used are often described, but the information provided is not sufficient to adequately reconstruct the contexts and their associations with the dated samples, nor to verify their Inca character. Finally, the dates integrating Group 3 (G3) present scarce and/or imprecise information, generating important doubts about the integrity of the context, the cultural assignation, and the association with the dated sample, even in those cases where the sample was recovered in an archaeological site with Inca architecture. In this group, we included those cases in which it was not possible to verify whether the dates corresponded to an Inca occupation or not (for example, those with no association to evidence of Inca presence).

Results

After analyzing the data, 28 dates were incorporated into Group 1, most of them (19) corresponding to sites located in the province of Jujuy. Another 36 were assigned to Group 2, and the 112 remaining dates to Group 3. The greatest probability areas of the oldest dates in G1 (mostly Jujuy) essentially ranges from 1381 until 1498 cal AD. Only one date from Salta was included in G1, showing a probability area that coincides with the Inca period with an average of 1486 cal AD. The main areas of the three oldest dates from G2 range between 1390 and 1597 cal AD. The only sample from Tucumán was assigned to G3. In Catamarca, the two calibrated dates in G1 range between 1428 and 1667 cal. AD, and the average for the main areas in the calibration with 1 δ is 1481 and 1502 cal AD, while the average for the case of the four oldest samples of G2 extends from 1458 until 1466 cal AD. The only group represented in La Rioja is G3. In San Juan, the main areas of the three oldest dates from G1 mainly covered the second part of 16th century, with averages ranging from 1478 to 1487 cal AD. Finally, in Mendoza, two dates in G1 obtained from the same archaeological site provided different calibrated results: 1408-1503 and 1439-1670 cal AD.

The majority of the analyses were conducted using charcoal or wood samples (n=113) that, to a greater or lesser extent, implies problems of "old wood" and delayed use of firewood (Bowman 1990). The presence of 20 cases with no data in terms of sample characteristics illustrates the frequent scarcity of information regarding the contexts of the dates.

Table 1. Calibration and classification of the analyzed ^{14}C dates

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
Jujuy	Pucará de Tilcara	Animal bone	LP-2965	570±50	1315-1357 1381-1455	0.189 0.810	1
	Esquina de Huajra	Human bone	UGA-16200	550±50	1318-1353 1383-1462	0.097 0.902	1
	Pucará de Tilcara	Charcoal	AA-88341	561±42	1323-1346 1388-1452	0.078 0.921	1
	Pucará de Tilcara	Animal bone	AA-88338	527±47	1326-1341 1390-1485	0.018 0.981	1
	Pucará de Tilcara	Animal bone	AA-88339	523±47	1328-1337 1391-1495	0.008 0.991	1
	Pucará de Tilcara	Animal bone	LP-2967	520±40	1396-1464 1470-1475	0.990 0.009	1
	Pucará de Tilcara	Charcoal	AA-88340	512±41	1398-1484	1	1
	Pucará de Tilcara	Human bone	AA-88342	510±46	1395-1498 1599-1608	0.989 0.010	1
	Pucará de Tilcara	Animal bone	LP-2467	470±50	1406-1512 1547-1623	0.798 0.201	1
	Pucará de Tilcara	Charcoal	LP-2191	450±60	1418-1627	1	1
	Pucará de Tilcara	Charcoal	LP-2231	450±50	1419-1521 1536-1626	0.681 0.318	1
	Esquina de Huajra	Human bone	GX-32577	450±50	1419-1521 1536-1626	0.681 0.318	1
	Pintoscayoc 1	Textile	CAMS-41069	450±50	1419-1521 1536-1627	0.681 0.319	1
	Pucará de Tilcara	Charcoal	LP-2240	450±40	1425-1512 1566-1623	0.758 0.215	1
	Pucará de Tilcara	Charcoal	LP-2448	440±40	1432-1515 1541-1625	0.690 0.309	1
	Pucará de Tilcara	Charcoal	LP-2433	380±50	1456-1640	1	1
	Esquina de Huajra	Charcoal	Beta-193319	340±55	1455-1669	0.989	1
	Esquina de Huajra	Human bone	GX-32576	320±50	1463-1672	0.952	1
	Esquina de Huajra	Charcoal	Beta-206910	280±50	1493-1690 1723-1808	0.680 0.312	1
	La Huerta	Charcoal	AC-0963	580±80	1283-1497	0.997	2

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Pucará de Volcán	Charcoal	Beta-80121	560±50	1317-1354 1382-1458	0.137 0.862	2
	La Huerta	Charcoal	AC-1069	540±90	1292-1514 1542-1624	0.880 0.119	2
	Pucará de Volcán	Charcoal	Beta-80122	530±70	1303-1364 1376-1511	0.121 0.809	2
	Los Amarillos	Charcoal	A-9603	520±40	1396-1464 1470-1475	0.990 0.009	2
	Los Amarillos	Charcoal	A-9600	505±50	1393-1505	0.954	2
	La Huerta	Charcoal	AC-0960	480±100	1309-1360 1378-1655	0.060 0.939	2
	Pucará de Volcán	Charcoal	Beta-80119	450±60	1418-1627	1	2
	Los Amarillos	Maize	AA-12136	450±50	1419-1521 1536-1626	0.681 0.318	2
	La Huerta	Charcoal	LP-1959	440±70	1416-1637	1	2
	Pucará de Volcán	Charcoal	LP-808	440±60	1424-1630	1	2
	C° Colorado Sitio 1	Charcoal	AC-1085	430±90	1393-1670	0.993	2
	Pucará de Volcán	Charcoal	LP-972	430±60	1430-1633	1	2
	Los Amarillos	Charcoal	A-9601	320±50	1463-1672	0.952	2
	Agua Hedionda	Charcoal	Beta-194232	310±60	1459-1681 1730-1802	0.853 0.146	2
	Agua Hedionda	No data	UGAMS-8559	330±25	1502-1593 1614-1651	0.698 0.301	2
	Cucho de Ocloyas	No data	GX-32582 AMS	320±40	1483-1669	0.992	2
	AP1	No data	LP-320	580±60	1300-1367 1373-1455	0.313 0.686	3
	Juire	Charcoal	A-9599	580±55	1304-1362 1377-1453	0.285 0.714	3
	La Bolsa	No data	Beta-65489	530±70	1303-1364 1376-1511	0.121 0.809	3
	AP1	No data	LP-315	530±52	1321-1348 1387-1497	0.045 0.953	3
	AP1	No data	LP-308	530±50	1323-1346 1388-1491	0.036 0.963	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Juella	Animal bone	AA-85689	486±42	1405-1453 1592-1614	0.947 0.052	3
	Juella	Charcoal	LP-2544	450±60	1418-1627	1	3
	Juella	Animal bone	LP-2556	450±50	1419-1521 1536-1626	0.681 0.318	3
	Juella	Animal bone	AA-85668	454±42	1420-1512 1566-1623	0.767 0.206	3
	Puerta de Zenta	Charcoal	AA-16241	438±48	1431-1526 1534-1627	0.627 0.372	3
	Doncellas	Straw	CSIC-577	360±50	1460-1648	1	3
	Putuquito	Charcoal	AA-16240	313±48	1481-1673	0.920	3
Salta	Cerro Llullaillaco	Hair	OxA-14878	400±25	1455-1517 1539-1625	0.49 0.506	1
	Nevado Chuscha	Wood	CSIC-1049	340±30	1497-1602 1606-1649	0.741 0.258	2
	Tolombón	Charcoal	GX-9251	500±60	1390-1513 1546-1623	0.857 0.130	2
	Tolombón	Charcoal	Beta-168672	440±50	1429-1527 1533-1627	0.628 0.371	2
	Tolombón	Charcoal	GX-29663	350±60	1451-1669	0.99	2
	Tolombón	Charcoal	Beta-171425	460±60	1409-1526 1534-1627	0.686 0.313	2
	Tolombón	Charcoal	Beta-171426	440±60	1424-1630	1	2
	Pucará Angastaco	Charcoal	GX-32997	660±40	1293-1403	1	3
	Tambo Angastaco	Charcoal	Beta-239861	570±60	1300-1367 1373-1459	0.261 0.738	3
	Potrero Payogasta	Wood	QL-4708	550±30	1399-1446	1	3
	Abra de Minas	Charcoal	LP-3025	540±50	1321-1349 1386-1478	0.060 0.939	3
	Tambo Angastaco	Charcoal	Beta-203739	530±40	1394-1460	1	3
	El Divisadero	Charcoal	LP-2006	520±60	1318-1353 1384-1508	0.053 0.894	3
	Fuerte Gualfin	Bone	Beta-278207	480±40	1408-1503 1591-1615	0.938 0.061	3
	Potrero Payogasta	Wood	QL-4714	486±30	1415-1486	1	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Tolombón	Human bone	UGA-16201	470±40	1411-1508 1584-1619	0.890 0.109	3
	Fuerte Gualfín Recintos bajos	Bone	UGA-5944	460±25	1434-1499	0.965	3
	Potrero Payogasta	Wood	QL-4709	453±20	1441-1497	0.980	3
	Compuel finca	Bone	UGA-5943	430±25	1445-1508 1582-1620	0.786 0.213	3
	El Divisadero	Charcoal	LP-2021	420±70	1427-1645	1	3
	Tambo Angastaco	Charcoal	Beta-239860	420±60	1436-1636	1	3
	Potrero Payogasta	Wood	QL-4704	413±22	1451-1511 1573-1622	0.659 0.325	3
	Potrero Payogasta	Dung	QL-4705	360±80	1436-1677	0.929	3
	Tambo Angastaco	Charcoal	Beta-239859	300±60	1459-1696 1725-1807	0.803 0.196	3
	Corralito V	Sediment	Beta-232249	390±40	1457-1629	1	3
Tucumán	El Paso	Animal bone	AA-104697	403±28	1453-1519 1537-1626	0.507 0.492	3
Catamarca	Agua Verde	Human bone	GX-19363-G	415±70	1428-1647	1	1
	Agua Verde	Human bone	GX-19364-G	380±70	1435-1667	0.999	1
	Pucará de Aconquija	Charcoal	LP-2499	480±60	1398-1518 1538-1626	0.780 0.219	2
	El Shincal de Quimivil	Charcoal	LP-601	480±50	1400-1511 1572-1622	0.857 0.130	2
	Tambillo Nuevo	Charcoal	LP-2152	460±50	1412-1515 1540-1625	0.739 0.260	2
	Pucará de Aconquija	Camelid bone	UGAMS-8560	460±25	1434-1499 1598-1609	0.965 0.034	2
	Rincón Chico 14	Charcoal	LP-1015	430±60	1430-1633	1	2
	Ampajango 2 - Rosendo Cáceres	Charcoal	Beta-146374	340±130	1420-1818	0.893	2
	Punta de Balasto	Charcoal	LP-816	680±70	1237-1241 1265-1429	0.005 0.994	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Festejo de los Indios	Charcoal	LP-3186	650±70	1279-1435	1	3
	Hualfín-Inka	Charcoal	AA-85879	650±54	1288-1418	1	3
	Costa de Reyes 5	Charcoal	AA-95917	631±37	1300-1367 1373-1418	0.610 0.389	3
	Formación Rocosa Las Grutas	Charcoal	LP-880	590±45	1312-1359 1379-1446	0.293 0.706	3
	El Molino	Human bone	AA-88363	585±44	1381-1448	0.754	3
	El Shincal de Quimivil	Charcoal	LP-588	570±60	1300-1367 1373-1459	0.261 0.738	3
	Caranchi Tambo	Charcoal	LP-788	560±60	1302-1364 1376-1478	0.207 0.792	3
	El Shincal de Quimivil	Charcoal	LP-735	550±50	1318-1353 1383-1462	0.097 0.902	3
	Aldea Piedra Negra	Charcoal	LP-2626	550±40	1328-1338 1390-1454	0.020 0.979	3
	Costa de Reyes 5	Charcoal	AA-95918	546±36	1395-1452	1	3
	Potrero Chaquiago	Charcoal	LP-445	530±90	1297-1519 1538-1626	0.850 0.149	3
	Aldea Piedra Negra	Charcoal	LP-2454	530±50	1323-1346 1388-1491	0.036 0.963	3
	Hualfín-Inka	Charcoal	AA-85875	523±39	1396-1462	1	3
	Hualfín-Inka	Charcoal	AA-85876	521±39	1396-1464	1	3
	Loma de la Escuela Vieja	Maize	AA-88362	521±36	1401-1458	1	3
	Hualfín-Inka	Charcoal	AA-85877	515±42	1396-1483	1	3
	Fiambalá-1	Grass	AA-81739	504±36	1404-1479	1	3
	Rincón Chico 12	Charcoal	Beta-130222	490±50	1396-1510 1577-1621	0.906 0.093	3
	Potrero Chaquiago	Charcoal	LP-319	480±50	1400-1511 1572-1622	0.857 0.130	3
	Quillay Wayras	Charcoal	AC-0552	460±100	1315-1357 1380-1668	0.035 0.962	3
	Potrero Chaquiago	Charcoal	Beta-59898	460±50	1412-1515 1540-1625	0.739 0.260	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Fiambalá-1	Grass	AA-69977	465±34	1421-1504 1590-1615	0.913 0.086	3
	Fiambalá-1	Grass	AA-95558	464±35	1420-1505 1588-1617	0.900 0.099	3
	Fiambalá-1	Grass	AA-81741	458±49	1413-1515 1540-1625	0.734 0.265	3
	Costa de Reyes 5	Charcoal	AA-95919	423±36	1444-1518 1538-1626	0.607 0.392	3
	Las Cuevas 1	Soot	AA-69978	419±76	1417-1650	1	3
	Potrero Chaquiago	Charcoal	LP-339	420±80	1410-1655	1	3
	Instalación de Altura 01	Charcoal	LP-1479	420±60	1436-1636	1	3
	Formación Rocosa Las Grutas	Charcoal	LP-864	410±60	1441-1640	1	3
	Las Mojarras 1 - Augier	Maize	LP-1310	400±60	1445-1643	1	3
	Fuerte Quemado – El Calvario	Charcoal	LP-2044	400±50	1450-1633	1	3
	Quillay Wayras	Charcoal	AC-0553	390±100	1397-1696 1725-1807	0.924 0.075	3
	Costa de Reyes 5	Charcoal	AA-95916	386±36	1440-1527 1554-1633	0.640 0.359	3
	Batungasta	Grass in adobe	AC-1720	380±60	1450-1649	1	3
	San Francisco-04	Animal bone	AA-93279	380±37	1461-1631	1	3
	Potrero Chaquiago	Charcoal	Beta-65998	370±50	1458-1644	1	3
	Potrero Chaquiago	Maize	Beta-49616 (2)	340±70	1450-1675 1737-1798	0.920 0.079	3
	Fuerte Quemado – El Calvario	Charcoal	LP-1903	340±50	1460-1664	1	3
	Aldea Piedra Negra	Charcoal	LP-2442	330±50	1460-1670	0.986	3
	Batungasta	Grass in adobe	LP-755	280±60	1511-1550 1622-1676 1735-1799	0.188 0.349 0.358	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Batungasta	No data	MTC-15591	278±29	1514-1600 1617-1666	0.545 0.429	3
La Rioja	Tambería Guandacol	Charcoal	LP-489	540±70	1300-1506 1587-1618	0.962 0.037	3
	Tambo La Ollita	Charcoal	LP-2804	530±50	1323-1346 1388-1491	0.036 0.963	3
	Tambería Guandacol	Charcoal	LP-820	510±60	1321-1348 1387-1511 1574-1622	0.032 0.883 0.079	3
	Tambería Guandacol	Charcoal	Beta-237659	470±40	1411-1508 1584-1619	0.890 0.109	3
	Tambería Guandacol	Charcoal	Beta-237661	440±50	1429-1527 1533-1627	0.628 0.371	3
	Tambería Guandacol	Vegetal remains	Beta-237660	370±40	1463-1638	1	3
	Tambería Guandacol	Charcoal	LP-828	340±65	1452-1673	0.944	3
	Tambería Guandacol	Charcoal from hearth	Beta-237662	300±30	1504-1590 1616-1671	0.409 0.554	3
San Juan	Tambo Tocota	Charcoal	I-11696	425±80	1409-1652	1	1
	Cerro Mercedario	Wood	AC-0330	390±80	1418-1671	0.984	1
	Pedernal Sitio 2	Charcoal	LP-1693	390±60	1448-1646	1	1
	Pircas Indias	Wood	AC-0331	350±80	1436-1685 1729-1803	0.909 0.090	1
	Tambo Alcaparrosa	No data	Beta-220329	530±40	1394-1460	1	2
	Tambo Alcaparrosa	Charcoal	Beta-220330	340±50	1460-1664	1	2
	Tambo Alcaparrosa	Charcoal	Beta-208527	710±60	1231-1247 1262-1404	0.025 0.974	3
	Tambo Alcaparrosa	No data	Beta-208528	700±60	1235-1242 1265-1410	0.009 0.990	3
	Tambo Alcaparrosa	No data	Beta-208526	560±60	1302-1364 1376-1478	0.207 0.792	3
	Tambo Alcaparrosa	No data	Beta-220328	560±60	1302-1364 1376-1479	0.207 0.793	3
	Tambo Santa Rosa	No data	LP-2740	550±50	1318-1353 1383-1462	0.097 0.902	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Tambo Santa Rosa	No data	LP-2407	520±50	1326-1340 1390-1499	0.015 0.971	3
	Tambo Santa Rosa	No data	LP 2748	500±50	1394-1506 1586-1618	0.941 0.058	3
	Tambo Santa Rosa	No data	LP-2386	480±50	1400-1511 1572-1622	0.857 0.130	3
	El Acequión	Charcoal	Beta-84113	400±60	1445-1643	1	3
	Tambo Santa Rosa	No data	LP-2411	400±50	1450-1633	1	3
	Tambo Santa Rosa	No data	LP-2394	320±60	1459-1675 1737-1798	0.896 0.103	3
Mendoza	Cerro Aconcagua	Human hair	Beta-88785	480±40	1408-1503 1591-1615	0.938 0.061	1
	Cerro Aconcagua	Human bone	GX19991	370±70	1439-1670	0.987	1
	Agua de la Cueva	No data	AC-1563	470±80	1392-1645	1	2
	Ranchillos	Charcoal	Beta-69933	430±50	1438-1627	1	2
	Ranchillos	Charcoal	I-17004	300±80	1454-1711 1719-1812	0.727 0.216	2
	Ranchillos	Charcoal	I-17002	290±80	1458-1712 1718-1813	0.676 0.243	2
	Ranchillos	Charcoal	I-17003	220±80	1511-1552 1622-1949	0.045 0.938	2
	Ranchillos	Charcoal	Beta-62946	890±80	1028-1287	1	3
	Tambillos	Wood	Beta-25221	770±50	1213-1323 1346-1388	0.817 0.182	3
	Ranchillos	Charcoal	Beta-69934	640±50	1293-1420	1	3
	Ciénaga Yalguaraz	Charcoal	UZ-2524/ ETH-5317	605±60	1299-1443	1	3
	Barrio Ramos	Human bone	AA-98708	583±43	1316-1355 1382-1447	0.222 0.777	3
	Potrero Las Colonias	Human bone	AA-66564	569±38	1323-1346 1388-1448	0.085 0.914	3
	Cerro Penitentes	No data	Beta-98941	550±50	1318-1353 1383-1462	0.097 0.902	3
	Tambillitos	Charcoal	Beta-88786	540±100	1290-1525 1535-1627	0.850 0.149	3

Prov.	Site	Material	Code	Years AP	Calib. 2σ	Area	Group
	Ciénaga Yalguaraz	Charcoal	UZ-2526/ ETH-5319	540±55	1317-1354 1383-1495	0.087 0.912	3
	Odisa	Human bone	AA-90284	529±42	1392-1464 1469-1476	0.993 0.006	3
	Ciénaga Yalguaraz	Charcoal	UZ-2525/ ETH-5318	485±60	1396-1517 1539-1625	0.802 0.197	3
	Barrio Ramos 1	Charcoal	I-16636	470±80	1392-1645	1	3
	Tambillitos	Charcoal	Beta-88787	460±80	1397-1643	1	3
	Alero Ernesto	No data	Beta-162400	460±60	1409-1526 1534-1627	0.686 0.313	3
	Agua Amarga	Charcoal	Beta-261727	450±50	1419-1521 1536-1626	0.681 0.318	3
	Ciénaga Yalguaraz	Charcoal	UZ-2527/ ETH-5320	420±60	1436-1636	1	3
	Tambillos	Charcoal	Beta-26283	410±70	1430-1649	1	3
	Ciénaga Yalguaraz	Charcoal	GaK-7312	390±90	1411-1675 1738-1798	0.950 0.049	3
	Tambillos	Charcoal	I- 16907	310±80	1451-1710 1720-1811	0.773 0.188	3
	Tambillos	Charcoal	I-16908	300±80	1454-1711 1719-1812	0.727 0.216	3
	Tambillos	Charcoal	I-16637	290±130	1454-1819 1825-1897	0.821 0.110	3
	Ciénaga Yalguaraz	Charcoal	GIF 4607	180±80	1638-1949	1	3

Sources: Albero and Angiolini 1985; Alfaro de Lanzone 1988; Bárcena 1998a, 1998b, 2009a, 2009b, 2015; Bárcena *et al*. 2008; Berberián *et al*. 1981; Callegari and Gonaldi 2007-2008; Castro and Yebra 2018; Coloca 2017; Cremonte *et al*. 2005, 2006-2007; Cremonte and Garay de Fumagalli 2013; Cremonte and Williams 2007; D'Altroy *et al*. 2000; Delfino 1999; Delfino and Pisani 2010; Delfino *et al*. 2015; Durán and García 1989; Durán *et al*. 2018; Fernández do Río 2010; Garay de Fumagalli 1998, 2003; Garay de Fumagalli and Cremonte 1997; García 2015; Gil *et al*. 2014; González 1999; González *et al*. 2001; Greco 2012; Greco and Otero 2016; González and Tarragó 2005; Hernández Llosas 2006; Krapovickas 1987-1988; Ledesma 2011; Leibowicz and Jacob 2012; Leibowicz 2013; López and Coloca 2015; Lynch 2010, 2012; Maldonado *et al*. 2016, Marsh *et al*. 2017; Michieli 1998; Moralejo 2009, 2011; Nielsen 1996, 1997, 2001, 2007; Orgaz and Ratto 2013, 2015; Otero 2013; Otero and Rivolta 2015; Ots *et al*. 2011; Palamarczuk and Greco 2012; Patané Aráoz 2017; Raffino 2004; Raffino and Alvis 1993; Raffino *et al*. 1996, 1997, 2004a, 2004b, 2004c; Ratto and Orgaz 2009; Ratto *et al*. 2012; Reynoso *et al*. 2010, Rusconi 1962, 1967; Schobinger 2001, 2004; Tarragó *et al*. 1998-1999, 2017; Vera *et al*. 2019; Wilson *et al*. 2007; Williams 1995, 1996, 2003, 2010; Williams and Castellano 2014; Williams and Cremonte 2013; Williams and D'Altroy 1998; Williams and de Hoyos 2001; Williams *et al*. 2010, 2013; Wynveldt *et al*. 2017.

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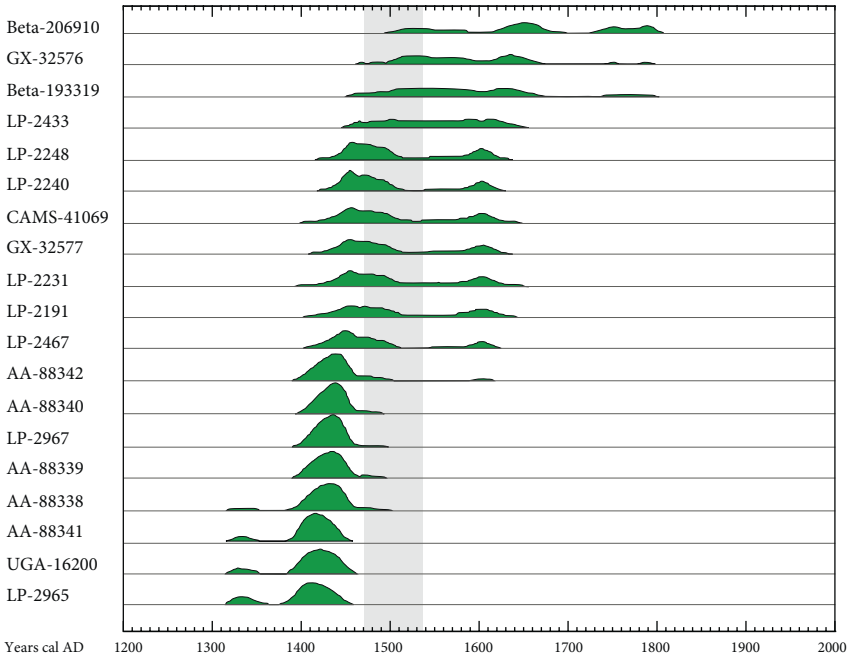
Discussion

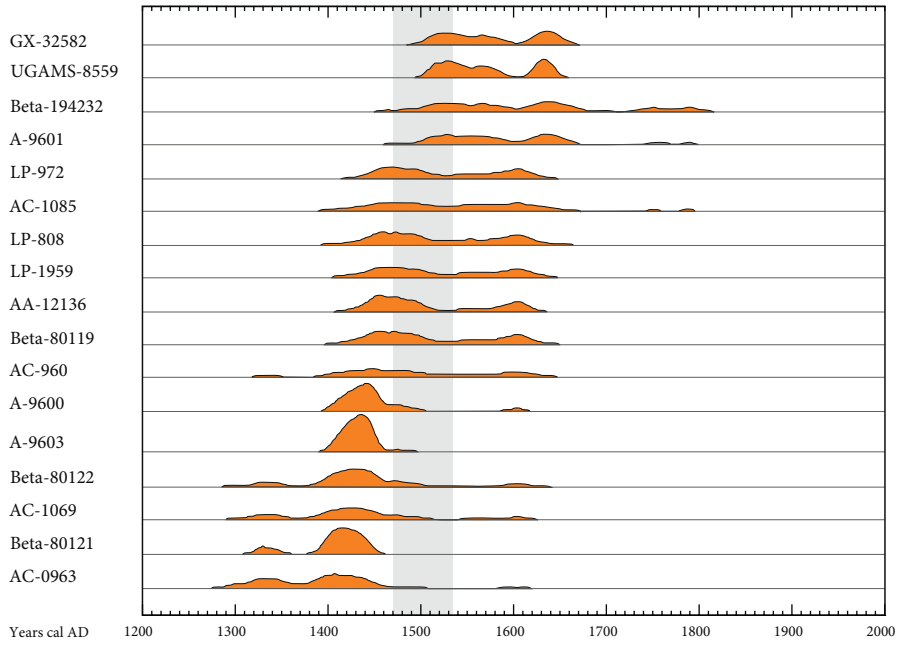
The traditional ethnohistoric proposal places the Inca entrance to northern Argentina during the reign of Topa Inca Yupanqui, between 1471 and 1493 AD (Rowe 1945). A more recent ethnohistoric alternative proposes a slightly older entry, between 1467 and 1475 AD (Bárcena 2007). Our analyses, in concordance with previous research (D'Altroy *et al*. 2007; Williams 2000), suggest that the Inca domination of Jujuy would have started during the first half of the 15th century (G1 dates visible in Figure 2). The average date for the three oldest dates (main probability areas) is *circa* (*ca*.) 1420 cal AD, showing a certain correspondence with the earliest dates in G2 (Figure 3). These results fall within the intermediate position of 1430 and 1410 cal AD proposed by Nielsen (1996, 1997) and Palma (2000) respectively, in the first case based on the dates obtained in the archaeological site Los Amarillos (G2) and the second considering a date obtained in La Huerta de Huacalera (Raffino and Alvis 1993). In our case, the dates correspond to the archaeological sites Pucará de Tilcara, Esquina de Huajra, and Pintoscayoc (Cremonte *et al*. 2006-2007; Greco y Otero 2016; Hernández Llosas 2006; Otero 2013).

Figure 2. Distribution areas of G1 ^{14}C calibrated dates (2σ) from Jujuy. Highlighted in grey is the traditional Inca period according to ethnohistorical sources



Source: Alejandro García, based on graphs obtained using the Calib 7.0.4 program, 2020.

Figure 3 Distribution areas of G2 ^{14}C calibrated dates (2σ) from Jujuy



Source: Alejandro García, based on graphs obtained using the Calib 7.0.4 program, 2020.

The G1 date from Salta (Figure 4) falls in the second half of the 15th century, and the average of the probability area corresponding to the Inca period is 1486 cal AD. The marked difference with that of Jujuy's dates suggests that the Capacocha of Cerro Llullaillaco was conducted a couple of decades after the Inca expansion in this sector. Capacochas were celebrated for a wide variety of reasons and not necessarily at the time of annexation of a new territory (Schroedl 2008). In agreement with this scenario, G2 dates show a certain delay in the annexation, considering that the earliest average is 1451 cal AD.

Tucumán provided only one ^{14}C date for the period analyzed (Figure 5), whose principal area occupies the second half of 15th century (average of 1486 cal AD). Despite the fact that it corresponds to G3, it is worth noting its closeness to the oldest G1 date from the province of Catamarca (average of 1481 cal AD). The averages for the main probability areas of Catamarca's G2 dates are only a few years older, ranging between 1458 and 1476 cal AD. Overall, these results provide evidence of the annexation of these territories during the first two or three decades of the second half of the 15th century.

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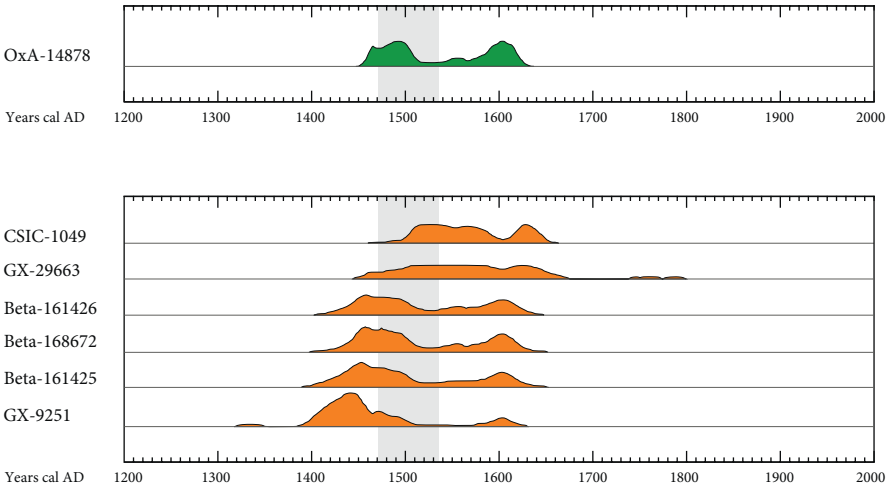
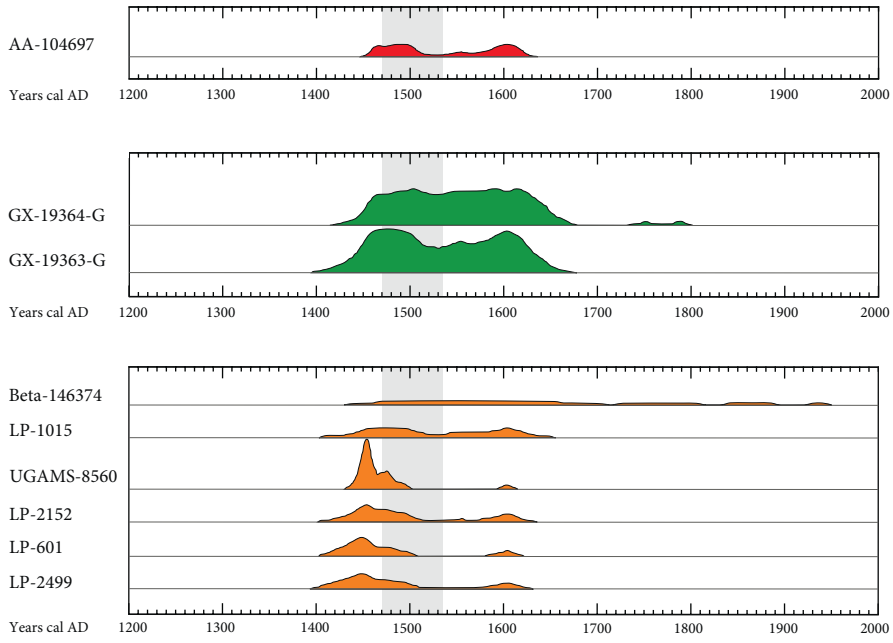
Figure 4. Distribution areas of G1 (above) and G2 (below) ^{14}C calibrated dates (2σ) from Salta



Source: Alejandro García, based on graphs obtained using the Calib 7.0.4 program, 2020.

Figure 5. Distribution areas of the Tucumán (G3, above) and Catamarca's (G1 in the center and G2 below) ^{14}C calibrated dates (2σ)

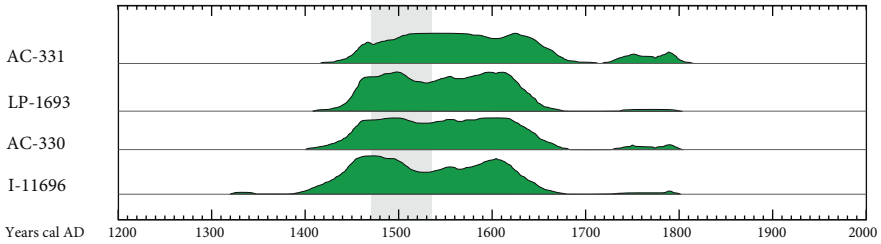


Source: Alejandro García, based on graphs obtained using the Calib 7.0.4 program, 2020.

Southwards, in La Rioja, there are no G1 dates. Most of the available analyses are from the pre-Inca village of Guandacol, in the southern extreme of the province (Bárcena 2009a; Callegari and Gonaldi 2007-2008), showing signs of architectonic modifications and later Inca occupation. Given the scarcity of contextual data, the contribution of these dates to the discussion is very limited.

In San Juan, calibration with 2σ of the G1 dates produces 95 % probability areas that are too large (Figure 6). In contrast, the 1σ calibration (68 % probability) of the three oldest dates of G1 presents "Inca" distribution areas with averages of 1478, 1487 and 1488 cal AD. These dates were obtained from Tambo de Tocota, Pedernal-Sitio 2 and Cerro Mercedario (Albero and Angiolini 1985; Berberián *et al.* 1981; García 2015).

Figure 6. Distribution areas of G1 ^{14}C calibrated dates (2σ) from San Juan

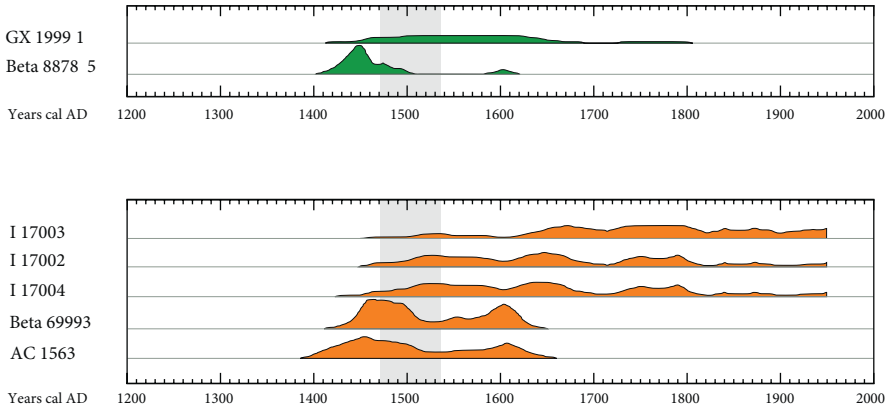


Source: Alejandro García, based on graphs obtained using the Calib 7.0.4 program, 2020.

These results would indicate a very late entry of the Incas to the south-central sector of San Juan, although the probability ranges of various G2 and G3 dates go back to the 14th or even the 13th century.

Finally, both G1 dates from Mendoza were obtained at the same archaeological site: Cerro Aconcagua (Figure 7). They correspond to analyses conducted on bone and hair from an individual sacrificed in a Capacocha (Bárcena 1998a; Schobinger 2001). The results are quite different (Table 1), as one of them points towards the mid-15th century (average 1446 cal AD for the main area), and the other shows a much wider distribution area with an average of 1554 cal AD. Beyond these differences, the problem of using these results for dating the incorporation of Mendoza to the Tawantinsuyu lies in the probable origin of the Capacocha. In fact, Cerro Aconcagua seems to have been linked mainly with the Inca occupation of the Aconcagua Valley (Central Chile) and not with that of the oriental Andean territories (Stehberg and Sotomayor 2005). This leads us to think that the ritual involving this human sacrifice probably originated in the current Chilean territory before the annexation of the Cuyo Valley (Mendoza). If we take the G2 dates as an alternative, the main area's averages of the two earliest dates are 1477 and 1459 cal AD, which somewhat coincide with those obtained in San Juan. Nevertheless, the scarcity of dates does not allow us to solve the issue in this area.

Figure 7. Distribution areas of ^{14}C calibrated dates (above, G1; below, G2; 2σ) from Mendoza



Source: Alejandro García, based on graphs obtained using the Calib 7.0.4 program, 2020.

It should be noted that Marsh *et al*. (2017) used Bayesian statistics to analyze the entire set of ^{14}C and TL presumably Inca dates from Mendoza and proposed a much earlier Inca entry for this province of between *ca*. 1380 and 1430 cal AD. The evaluation of this interesting work requires a more extensive space than the one available here. The main problem with it is that the authors gave all the dates a high degree of confidence (including those from problematic or scarcely informed sites such as Ciénaga de Yalguaraz, Odisa, Cerro Penitentes, Tambillos, Tambillitos, and Alero Ernesto). They also failed to consider the problems with TL local dates (Bárcena 1998a). From our perspective, this constitutes a serious problem that undermines their conclusions.

It is also important to note that although we use the average of the main areas, the probability ranges of the dates are wider and not necessarily represented by the mid-points. The use of full probability ranges provides a more complex picture. On the one hand, in 54.5 % of the cases (n=96) it is observed that part of the probability range falls in the Colonial period. This is related to the precision of the method and calibration, since all the dates used correspond to Inca contexts that did not include Colonial elements. This makes it possible to rule out the possibility that the correct dates belong to this last period.

On the other hand, many dates have probability ranges that extend through the 13th and 14th centuries. Since the Inca state would have still been developing in the Cuzco valley during the 14th century (Bauer and Smit 2015; Covey 2003), previous dates should be discarded. The beginnings of the main areas of probability correspond to the end of the 14th century and first decades of the 15th: 1381 and 1382 cal AD for the oldest G1 and G2 dates from Jujuy, 1390 and 1428 cal AD for Salta (G2 and G1), 1398 (G2) and 1409 cal AD (G1) for Catamarca, 1394 cal AD (G2) for San Juan, and 1408 (G1) and 1438 cal AD (G2) for Mendoza. These dates maintain a certain progression from north to south and would indicate the possibility of expansion from Jujuy to Mendoza in less than 30 years, between 1381 and 1408

cal AD. This would represent a very rapid advance, discordant with the large quantitative and qualitative differences in the Inca archaeological records for the whole area. In addition, a beginning of the Inca expansion in Jujuy towards the end of the 14th century does not coincide with the information available for Bolivia, where this process (necessarily previous) would have begun around 1400 AD (Alconini 2016; Gyarmati and Varga 1999; Korpisaari *et al*. 2003; Meyers 2007, 2016; Pärssinen *et al*. 2003; Rivera Casanovas 2014).

On the contrary, if we take into account the averages of the main areas of probability, the result shows a more extended progression for the beginning of the annexation process in each sector of the current Argentine territory, as suggested in Table 2.

Table 2. Approximate chronological sequence proposed for the Inca annexation of Argentine territories

Province	Probable date
Jujuy	*ca*. 1420 cal AD
Salta	*ca*. 1450 cal AD
Catamarca - Tucumán	*ca*. 1460 cal AD
La Rioja - San Juan	*ca*. 1475 cal AD
Mendoza	*ca*. 1475 cal AD

Source: Alejandro García, 2020.

According to this sequence, and considering the location of the analyzed archaeological sites, we can distinguish at least three stages corresponding to three sectors in the southwardly annexation process. At first, the Incas would have advanced until approximately *ca*. 24° S, in southern Jujuy, and followed on to the territories located in southern Jujuy, Salta, Tucumán, and Catamarca up to *ca*. 28° S. Finally, they would have reached and incorporated those territories located until *ca*. 34° 30' S, in the current provinces of La Rioja, San Juan and Mendoza, a few years later. In this wide space, the chance of distinguishing at least two more advancing stages through future dates is not discarded, the latter possibly linked with the conquest of Mendoza. The ordered distribution from north to south of these sectors does not necessarily mean that this was always the course followed by the Incas. Considering the scarcity of G1 dates, especially in the southern half of the analyzed area, a larger sample is likely to provide evidence of a more complex advance, as suggested by Cornejo (2014) for the Chilean case. In fact, in San Juan there are vast territories with no evidence of Inca occupation. Nevertheless, they are located between areas effectively ruled (García 2017a), and it has been proposed that this space and the one corresponding to Mendoza were in fact annexed from the west (Bárcena 1992, García 2009). In sum, instead of a sequential and continuous process from north to south, the Inca expansion in Argentina probably showed interruptions and transverse movements linked to already dominated populations on the Chilean side.

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This would illustrate the marked quantitative and qualitative difference in the Inca infrastructure and material culture observed between these areas of the Argentine Collasuyu. The delay in continuing the expansion southwards from Jujuy could be linked both to local resistance and to the importance assigned by the state to the domination of this area as a strategic base for future movements. Archaeological evidence of sites such as Los Amarillos and Juella (Leibowicz 2013; Nielsen 2007) has been interpreted as a result of abandonment related to the entrance of the Incas, and signs of destruction are evident in sites located south of Jujuy, such as Potrero de Payogasta (Salta) and Fuerte Quemado – El Calvario, in Catamarca (D'Altroy *et al*. 2000; Reynoso *et al*. 2010). While this, together with indications of the construction of large defensive sites (*pucaras*), such as Pukará Morado, Puerta de Zenta, Pucará de las Pavas, and Pucará de Aconquija (Nielsen 1996; Williams and D'Altroy 1998) is not undisputed evidence of resistance, it cannot be ruled out as a possible reflection of it. On the other hand, the late annexation of those territories south of *ca*. 30° S, bordering with the spaces occupied by hunter-gatherers, could have been linked with the low demographic density of those groups and their non-centralized political organization.

In the southern extreme, the Huarpe groups were probably not more than 30 000 individuals distributed throughout a wide space, adjacent to the south and east with non-sedentary populations (*Comechingones*, *Pampas* and *Puelches*). It is true that Inca domination was very strong in Central Chile, where local populations would also have followed a village settlement pattern. However, for the previous 1500 years, both sides of the Andes show remarkable differences of cultural development within the same socio-political organization class (i.e., tribal), which are reflected both in the characteristics and visibility of the archaeological records (Falabella *et al*. 2016; García 2017b). Thus, dozens of habitation sites and cemeteries have been studied on the Chilean side, while in the Huarpe area, despite the intense work conducted during recent decades, remains of just one village and one cemetery have been found in San Juan (Cerro Calvario; Gambier 2000) and in northwest Mendoza (Rusconi 1962), respectively. The uneven degree of elaboration of some handicraft goods (mainly pottery) is another element that reflects the differences in the complexity between the eastern and western village organizations, undoubtedly related to significantly disparate levels in terms of demography and population concentration. Therefore, the presence of multiple groups of low demographic density and the absence of centralized authorities in San Juan and Mendoza could have constituted an obstacle for the advance of the Inca domain, in the same way as it did later for the Spaniards (García 2004). Hence, it is not surprising that the Incas prioritized the control of central Chile, and that the Cuyo territory was annexed decades later, based on consolidated power on the Chilean side. Besides, the advance through this area could have also been related to the interests of Chilean Diaguitas, the principal allied in this part of the Collasuyu.

In turn, this panorama suggests a marked variability in the development of the successive borders resulting from the advance towards the south. The configuration of the boundaries must have depended on a series of factors (Williams and D´Altroy 1998), such as the degree of local resistance, the importance of local resources, the demographic and organizational characteristics of each population, and the mode of control over each region (direct, indirect, or delegated, *sensu* Lima Tórrez 2005). The presence of state fortifications in the tropical flanks of northwest Argentina could respond to the need to defend against possible attacks by eastern groups, such as the Guarani (Raffino and Stehberg 1999). In the south of Catamarca, on the other hand, the absence of fortresses would indicate a more stable and controlled situation, probably related to the lower demographic density, and economic, and sociopolitical level of the native groups in the area.

Another important aspect to highlight is the scarce quantity of dates corresponding to G1 (n=28), representing only a 15.7 % of the assemblage. If we exclude the dates obtained from the archaeological sites of Esquina de Huajra and Pucará de Tilcara (n=18), the percentage diminishes to 5.6 %, which corresponds to only 8 of the 74 remaining sites. In contrast, most of the dates (n=114) correspond to G3 (64 %), and many of them are simply referenced as "Inca" for their likely spatial association with sites, architecture or objects of Inca provenance, without any contextual information of the sample guaranteeing such assertion. The need to improve the transmission of the information of the dated samples and their cultural contexts is evident; the confidence inspired by this data should rest on the detailed and precise presentation of dated materials and associated elements, rather than on the authority of the researchers. In this sense, it is worth noting the scarce reference to post-depositional alteration studies in articles referring to Inca dates. Many dates were obtained in residential sites, and are very likely to have been altered because of the great possibility that they may have been modified, given their normal use and posterior formation process. Thus, these aspects must be approached as accurately as possible, in order to increase the level of confidence in our chronological dates.

Finally, the chronological differences of our results with the traditional historical view are evident, but also with those archaeological approaches that trace the inclusion of some of these territories back to the 14th century (Marsh *et al*. 2017; Schiappacasse 1999).

Conclusions

Although obtaining an exact chronology for the Inca expansion is not possible, conducting an analysis providing an approximate chronological frame for this process is feasible. The earliest ages of the main probability areas of the best-informed ^{14}C dates suggest that the Incas were able to incorporate Jujuy *ca*. 1381 cal AD, and reach Mendoza *ca*. 1408 cal AD. Nevertheless, this chronology would not be coherent with that of the beginning of the Inca expansion out of Cuzco and with

the archaeological records for Collasuyu. It also seems not to adjust to the time required to successfully annex such a vast territory.

Alternatively, the mid-points of those ranges indicate that the Inca annexation of the western Argentine territories would have initiated in *ca*. 22° S towards 1420 cal AD and would have reached *ca*. 29°-33° S in the second half of the 15th century, perhaps *ca*. 1475 cal AD.

These dates are far from those traditionally proposed in ethnohistorical research. Indeed, the latter should be abandoned as a general chronological framework to understand the Inca expansion to the south, as has been repeatedly pointed out by various archaeologists in recent decades.

The rhythm of advance towards the south would have been articulated with the political and economic situation in the rest of the Empire, but organizational structures of local populations and available local resources could have played an important role as well. In this sense, the chronology obtained reflects a notable state interest in securing dominion primarily over the densely populated territories in the Quebrada de Humahuaca and surrounding areas before continuing the advance southwards, as well as a late interest in villages with low demographic density located beyond *ca*. 31° S.

Finally, it is important to highlight the scarcity of precise context data from the dated samples, which constitutes a difficult problem to solve that should be considered in future fieldwork and articles concerning the topic.

References

1. Adamska, Anna and Adam Michczyński. 1996. "Towards Radiocarbon Chronology of the Inca State." *Boletín de la Misión Arqueológica Andina* 1: 35-58.
2. Albero, Miguel and Fernando Angiolini. 1985. "INGEIS Radiocarbon Laboratory Dates II." *Radiocarbon* 27 (2B): 314-337.
3. Alconini, Sonia. 2016. *Southeast Inka Frontiers Boundaries and Interactions*. Florida: University Press of Florida.
4. Alfaro de Lanzone, Lidia. 1988. *Excavación de la cuenca del río Doncella. Reconstrucción de una cultura olvidada en la puna jujeña*. San Salvador de Jujuy: Dirección de Antropología e Historia.
5. Bárcena, J. Roberto. 1988. "Investigación de la dominación incaica en Mendoza. El tambo de Tambillos, la vialidad anexa y los altos cerros cercanos." *Espacio, Tiempo, Forma, Serie I, Prehistoria* 1: 397-426. https://doi.org/10.5944/etfi.1.1988.4501
6. Bárcena, J. Roberto. 1998a. *Arqueología de Mendoza. Las dataciones absolutas y sus alcances*. Mendoza: Editorial Universidad Nacional de Cuyo.
7. Bárcena, J. Roberto. 1998b. "El tambo real de Ranchillos, Mendoza, Argentina." *Xama* 6-11: 1-52.
8. Bárcena, J. Roberto. 2007. "El período Inka en el centro-oeste y noroeste argentino: aspectos cronológicos en el marco de la dominación del Kollasuyu." In *Sociedades*

Precolombinas surandinas. Temporalidad, interacción y dinámica cultural del NOA en el ámbito de los Andes centro-sur, edited by Verónica Williams, Beatriz Ventura, Adriana Callegari and Hugo Yacobaccio, 251-281. Buenos Aires: Artes Gráficas Buschi.

9. Bárcena, J. Roberto. 2009a. "Investigaciones arqueológicas en la 'Tambería de Guandacol' (Departamento Felipe Varela, Provincia de La Rioja)." In *Arqueología del centro oeste argentino. Aportes desde las IV Jornadas Arqueológicas Cuyanas*, edited by Roberto Bárcena, 121-181. Mendoza: INCIHUSA-CONICET.
10. Bárcena, J. Roberto. 2009b. "Dataciones por radiocarbono en el sector con grabados rupestres de Arroyo Campos Borbarán (Estancia Tierras Blancas, Departamento de San Carlos, Provincia de Mendoza)." In *Arqueología del centro oeste Argentino. Aportes desde las IV Jornadas Arqueológicas Cuyanas*, edited by Roberto Bárcena, 17-46. Mendoza: INCIHUSA-CONICET.
11. Bárcena, J. Roberto. 2015. "Investigaciones en los pasos cordilleranos de La Rioja y San Juan: sitios inka de Comecaballos, La Ollita y Santa Rosa. Arqueología, patrimonio cultural y minería." In *Arqueología y etnohistoria del centro oeste argentino. Aportes desde las V Jornadas arqueológicas Cuyanas*, edited by Roberto Bárcena, 95-117. Mendoza: INCIHUSA-CONICET.
12. Bárcena, J. Roberto, Pablo Cahiza, Jorge García Llorca, and Sergio Martín. 2008. *Arqueología del sitio inka de La Alcaparrosa. Parque Nacional San Guillermo. Provincia de San Juan, República Argentina*. Mendoza: INCIHUSA-CONICET.
13. Bauer, Brian and Douglas Smit. 2015. "Separating the Wheat from the Chaff. Inka Myths, Inka Legends, and the Archaeological Evidence for State Development." In *The Inka Empire. A Multidisciplinary Approach,* edited by Izumi Shimada, 67-80. Austin: University of Texas Press.
14. Berberián, Eduardo, Juana Martín de Zurita and Dussan Gambetta. 1981. "Investigaciones arqueológicas en el yacimiento incaico de Tocota (Prov. de San Juan, Rep. Argentina)." *Anales de Arqueología y Etnología* 32-33: 173-210.
15. Boaretto, Elisabetta. 2009. "Dating Materials in Good Archaeological Contexts: The Next Challenge for Radiocarbon Analysis." *Radiocarbon* 51 (1): 275-281. https://doi.org/10.1017/S0033822200033804
16. Bowman, Sheridan. 1990. *Radiocarbon Dating*. Great Britain: University of California Press – British Museum.
17. Callegari, Adriana and María Gonaldi. 2007-2008. Guandacol. "Estructuras arquitectónicas tardías del sudoeste de la Provincia de La Rioja." *Arqueología* 14: 173-187.
18. Castro, Silvina and Lucía Yebra. 2018. "Ocupación tardía de la precordillera de Mendoza: organización tecnológica en Agua de la cueva Sector Norte (ca. 1700-470 años cal. AP)." *Anales de Arqueología y Etnología* 73 (1): 7-40.
19. Coloca, Federico. 2017. "La arquitectura de Abra de Minas, un sitio con evidencias tardías/incaicas en la puna de Salta, Argentina." *Intersecciones en Antropología* 18 (2): 245-256.
20. Cornejo, Luis. 2014. "Sobre la cronología del inicio de la imposición cuzqueña en Chile." *Estudios Atacameños* 47: 101–16. http://dx.doi.org/10.4067/S0718-10432014000100007

21. Covey, Alan. 2003. "A Processual Study of Inka State Formation." *Journal of Anthropological Archaeology* 22 (4): 333–357. https://doi.org/10.1016/S0278-4165(03)00030-8
22. Cremonte, Beatriz, María Zaburlín, and Sebastián Peralta. 2005. "Ordenamiento espacial y arquitectura del sitio incaico Agua Hedionda." *Cuadernos FHyCS-UNJu* 29: 23-42.
23. Cremonte Beatriz, Sebastián Peralta, and Agustina Scaro. 2006-2007. "Esquina de Huajra (Tum 10. departamento Tumbaya, Jujuy). Avances en el conocimiento de una instalación Humahuaca 23. Inca y su integración en la historia prehispánica regional." *Cuadernos del INAPL* 21: 27-38.
24. Cremonte, Beatriz, and Verónica Williams. 2007. "La construcción social del paisaje durante la dominación Inka en el Noroeste Argentino." In *Procesos sociales prehispánicos en el sur andino: la vivienda, la comunidad y el territorio*, compiled by Axel Nielsen, Clara Rivolta, Verónica Seldes, María Vázquez, and Pablo Mercolli, 207-236. Córdoba: Brujas.
25. Cremonte, Beatriz and Mercedes Garay de Fumagalli. 2013. "Diferentes modalidades de estructuración de la frontera suroriental inka en el actual territorio de Jujuy." In *Al borde del imperio. Paisajes sociales, materialidad y memoria en áreas periféricas del noroeste argentino*, compiled by Verónica Williams and Beatriz Cremonte, 57-74. Buenos Aires: Sociedad Argentina de Antropología.
26. D'Altroy, Terence, Ana Lorandi, Verónica Williams, Milena Calderari, Christine Hastorf, Elizabeth DeMarrais, and Melissa Hagstrum. 2000. "Inka Rule in the Northern Calchaqui Valley, Argentina." *Journal of Field Archaeology* 27 (1): 1-26. https://doi.org/10.2307/530649
27. D'Altroy, Terence, Verónica Williams, and Ana Lorandi. 2007. "The Inkas in the Southlands." In *Variations in the Expression of Inka Power*, edited by Richard Burger, Craig Morris, and Ramiro Matos, 85–134. Washington: Dumbarton Oaks.
28. Delfino, Daniel. 1999. "Prospecciones en los '90: nuevas evidencias para repensar la arqueología de Laguna Blanca (Dpto. Belén, Catamarca)." *Revista de Ciencia y Técnica* 7: 55-80.
29. Delfino, Daniel and Gustavo Pisani. 2010. "Lejos de los caminos, un nuevo mundo de tambos, santuarios y collcas. Laguna Blanca, Catamarca." In *Arqueología argentina en el Bicentenario de la Revolución de Mayo,* Tomo II, edited by Roberto Bárcena and Horacio Chiavazza, 783-788. Mendoza: INCIHUSA-CONICET - Facultad de Filosofía y Letras (UNCuyo).
30. Delfino, Daniel, Alejandro Díaz, and Valeria Espiro. 2015. "Prácticas sociales en el pasado y presente de Laguna Blanca (Dpto. Belén, Catamarca): reflexiones en torno al modo de vida comunitario agrocéntrico." In *Crónicas materiales Precolombinas: arqueología de los primeros poblados del NO argentino. Sección paisajes, territorios y redes de interacción*, edited by Alejandra Korstanje, Marisa Lazzari, Mara Basile, Fabiana Bugliani, Verónica Lema, Lucas Pereyra Domingorena, and Marcos Quesada, 385-426. Sociedad Argentina de Antropología, Buenos Aires.
31. Durán, Víctor and Cristina García. 1989. "Ocupaciones agroalfareras en el sitio Agua de La Cueva Sector Norte (N.O. de Mendoza)." *Revista de Estudios Regionales* 3: 29-64.

32. Durán, Víctor, Paula Novellino, Lumila Menéndez, Alejandra Gasco, Erik Marsh, Ramiro Barberena, and Cecilia Frigolé. 2018. "Barrio Ramos I. Prácticas funerarias en el inicio del período de dominación inca del valle de Uspallata (Mendoza, Argentina)." *Relaciones de la Sociedad Argentina de Antropología* 43 (1): 55-86.
33. Falabella, Fernanda, Daniel Pavlovic, Teresa Planella, and Lorena Sanhueza. 2016. "Diversidad y heterogeneidad cultural y social en Chile Central durante los períodos Alfarero Temprano e Intermedio Tardío (300 años a.C. a 1.450 años d.C.)." In *Prehistoria en Chile. Desde los primeros habitantes hasta los Incas*, edited by Fernanda Falabella, Mauricio Uribe, Leonor Sanhueza, Carlos Aldunate, and Jorge Hidalgo, 365-399. Santiago de Chile: Editorial Universitaria – Sociedad Chilena de Arqueología.
34. Fernández do Río, Soledad. 2010. "Prácticas locales, poder imperial y control espacial. Dominio inca y relaciones coloniales en el sector medio de la Quebrada de Humahuaca." Unpublished PhD Thesis, Facultad de Filosofía y Letras, Universidad de Buenos Aires.
35. Gambier, Mariano. 2000. *Prehistoria de San Juan*. San Juan: Ansilta.
36. Garay de Fumagalli, Mercedes. 1998. "El Pucará de Volcán, historia ocupacional y patrón de instalación." In *Los desarrollos locales y sus territorios. Arqueología del NOA y sur de Bolivia*, compiled by Beatriz Cremonte, 131-150. Jujuy: Universidad Nacional de Jujuy.
37. Garay de Fumagalli, Mercedes. 2003. "El Cucho de Ocloyas. Control e interacción en los valles orientales de Jujuy." *Cuadernos FHyCS-UNJu* 20: 133-150
38. Garay de Fumagalli, Mercedes, and Beatriz Cremonte. 1997. "Correlación cronológica del yacimiento de Volcán con sitios de los Valles Orientales (Sector Meridional, Quebrada de Humahuaca)." *Avances en Arqueología* 3: 191-212.
39. García, Alejandro. 2004. "La conquista de Cuyo y el mito del pacifismo huarpe." In *Tras las huellas de la identidad huarpe*, edited by Alejandro García, 41-60. Mendoza: Facultad de Filosofía y Letras, Universidad Nacional de Cuyo.
40. García, Alejandro. 2009. "El dominio incaico en la periferia meridional del Tawantinsuyu. Revisión de las investigaciones arqueológicas en la región de Cuyo, Argentina." *Sociedades de paisajes áridos y semi-áridos* 1, 47-73.
41. García, Alejandro. 2015. "Estudios arqueológicos en la frontera sudoriental del Tawantinsuyu: la excavación de Pedernal-Sitio 2." *Revista Española de Antropología Americana* 45 (2): 439-455.
42. García, Alejandro. 2017a. "La vialidad incaica en la provincia de San Juan." *Boletín del Museo Chileno de Arte Precolombino* 22 (1): 137-150.
43. García, Alejandro. 2017b. "Intensificación económica y complejidad sociopolítica huarpe (centro-norte de Mendoza)." *Intersecciones en Antropología* 18:157-167.
44. Gil, Adolfo, Ricardo Villalba, Andrew Ugan, Valeria Cortegoso. Gustavo Neme, Teresa Michieli, Paula Novellino, and Víctor Durán. 2014. "Isotopic Evidence on Human Bone for Declining Maize Consumption during the Little Ice Age in Central Western Argentina." *Journal of Archaeological Science* 49: 213-227. https://doi.org/10.1016/j.jas.2014.05.009
45. González, Luis. 1999. "Tambo feroz. Nuevos datos sobre el asentamiento de Punta de Balasto y la ocupación incaica en el sur del valle de Santa María (Prov. de Catamarca)."

In *Actas del XII Congreso Nacional de Arqueología Argentina*, Tomo 1, 222-232. La Plata: Universidad Nacional de La Plata.

46. González, Luis and Myriam Tarragó. 2005. "Vientos del sur. El valle de Yocavil (noroeste argentino) bajo la dominación incaica." *Estudios Atacameños* 29: 67-95. http://dx.doi.org/10.4067/S0718-10432005000100004
47. González, Luis, Raúl Doro, Paola Corvalán, Nora Grossman, Mariela Tancredi, and Ana Vargas. 2001. "Investigaciones en el sitio 12 de Rincón Chico, valle de Yocavil (Catamarca)." In *Actas XIII Congreso Nacional de Arqueología Argentina,* Tomo II, 375-383. Córdoba.
48. Greco, Catriel. 2012. "Integración de datos arqueológicos, radiocarbónicos y geofísicos para la construcción de una cronología de Yocavil y alrededores." Unpublished PhD Thesis, Facultad de Filosofía y Letras, Universidad de Buenos Aires.
49. Greco Catriel and Clarisa Otero. 2016. "The Chronology of Settlements with pre-Inca and Inca Occupations Superimposed: The Case of Pucará de Tilcara (Humahuaca Gorge, Argentina)." *Archaeometry* 58 (5): 848-862. https://doi.org/10.1111/arcm.12188
50. Gyarmati, János and András Varga. 1999. *The Chacaras of War. An Inka State Estate in the Cochabamba Valley, Bolivia*. Budapest: Museum of Ethnography.
51. Hernández Llosas, Isabel. 2006. "Inkas y españoles a la conquista simbólica del territorio Humahuaca: sitios, motivos rupestres y apropiación cultural del paisaje." *Boletín del Museo Chileno de Arte Precolombino* 11 (2): 9-34.
52. Hogg, Alan, Quan Hua, Paul Blackwell, Mu Niu, Caitlin Buck, Thomas Guilderson, Timothy Heaton, Jonathan Palmer, Paula Reimer, Ron Reimer, Christian Turney, and Susan Zimmerman. 2013. "SHCal13 Southern Hemisphere Calibration, 0–50.000 Years cal BP." *Radiocarbon* 55 (4): 1889-1903. https://doi.org/10.2458/azu_js_rc.55.16783
53. Korpisaari, Antti, Juan Faldín, Risto Kesseli, Jussi Korhonen, Sanna Saunaluoma, Ari Siiriäinen, and Marti Pärsinen. 2003. "Informe preliminar de las investigaciones arqueológicas de la temporada 2002 en el sitio de la Fortaleza de las Piedras." In *Reports of the Finnish-Bolivian Archaeological Project in the Bolivian Amazon II*, edited by Ari Siiriäinen and Antti Korpisaari, 7-33. Helsinki.
54. Krapovickas, Pedro. 1987-1988. "Nuevos fechados radiocarbónicos para el sector oriental de la Puna y la Quebrada de Humahuaca." *Runa* 17-18: 207-219.
55. Ledesma, Rosana. 2012. "Las apropiaciones territoriales prehispánicas en Cafayate (Salta)." *Estudios Sociales del NOA Nueva Serie* 11: 7-31.
56. Leibowicz, Iván. 2013. "Testimonios de un Adiós. Rituales y abandono en Juella ante la conquista Inka de Humahuaca." *Arqueología* 19 (1): 153-176.
57. Leibowicz, Iván and Cristian Jacob. 2012. "La Conquista Inka de Humahuaca, Jujuy, Argentina. Nuevos fechados y visiones desde los Desarrollos Regionales.." *Inka Llaqta* 3: 191-210.
58. Lima Tórrez, María del Pilar. 2005. "¿Por alianza o por la fuerza? Establecimiento del inkario al sur del Lago Poopó, la relación del imperio con las poblaciones locales." *Xama* 15-18: 161-175
59. López, Gabriel, and Federico Coloca. 2015. "El sitio Abra de Minas: nuevos aportes para la caracterización de las ocupaciones tardías/incas en las tierras altas del noroeste

argentino." *Bulletin de l'Institut français d'études andines* 44 (1): 141-149. https://doi.org/10.4000/bifea.7441

60. Lynch, Julieta. 2010. "La construcción del paisaje y la organización del espacio en el Sector Norte del Valle de Hualfín, Catamarca." Unpublished PhD Thesis, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata. http://sedici.unlp.edu.ar/handle/10915/5247
61. Lynch, Julieta. 2012. "Una aproximación cronológica al centro administrativo Hualfín Inka, Catamarca, Argentina." *Revista Española de Antropología Americana* 42 (2): 321-337. https://doi.org/10.5209/rev_REAA.2012.v42.n2.40108
62. Maldonado, Mario, María Sampietro Vattuone, Adriana Blasi, Carola Castiñeira Latorre, José Luis Peña Monné, and Alejandra Pigoni. 2016. "Estratigrafía, paleoambiente y procesos de formación de sitio en El Paso durante el Holoceno Tardío (Valle de Santa María, Noroeste Argentino)." In *Geoarqueología de los Valles Calchaquíes*, edited by Marta Sampietro Vattuone and José Luis Peña Monné, 121-144. Tucumán: Laboratorio de Geoarqueología, Universidad Nacional de Tucumán.
63. Malpass, Michael and Sonia Alconini, eds. 2010. *Distant Provinces of the Inka Empire. Toward a Deeper Understanding of Inka Imperialism.* Iowa: University of Iowa Press.
64. Marsh, Erik, Ray Kidd, Donald Ogburn, and Víctor Durán. 2017. "Dating the Expansion of the Inca Empire: Bayesian Models from Ecuador and Argentina." *Radiocarbon* 59 (1): 117-140. https://doi.org/10.1017/RDC.2016.118
65. Meyers, Albert. 2007. "Toward a Reconceptualization of the Late Horizon and the Inka Period: Perspectives from Cochasquí, Ecuador, and Samaipata, Bolivia." In *Variations in the Expressions of Inka Power*, edited by Richard Burger, Craig Morris and Ramiro Matos Mendieta, 223-254. Washington, D.C: Dumbarton Oaks.
66. Meyers, Albert. 2016. "Inca Archaeology and the Late Horizon: Some Polemic Remarks." *Tambo. Boletín de Arqueología* 3: 255-282.
67. Michieli, Catalina. 1998. "Aproximaciones a la identificación de una cerámica indígena posthispánica del sur de San Juan." *Publicaciones* 22: 55-76.
68. Moralejo, Reinaldo. 2009. "El 'Tambillo Nuevo' de la sierra de Zapata (Provincia de Catamarca)." *Arqueología* 15: 207-215.
69. Moralejo, Reinaldo. 2011. "Los inkas al sur del valle de Hualfín: organización del espacio desde una perspectiva paisajística." Unpublished PhD Thesis, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata. http://sedici.unlp.edu.ar/handle/10915/5242
70. Nielsen, Axel. 1996. "Demografía y cambio social en Quebrada de Humahuaca (Jujuy, Argentina) 700-1535 d.C." *Relaciones de la Sociedad Argentina de Antropología* 21: 307-354.
71. Nielsen, Axel. 1997. "Tendencias temporales en la Cultura Material de la Quebrada de Humahuaca (Jujuy, Argentina) ca. 700-1650 D.C." *Avances en Arqueología* 3: 147-189.
72. Nielsen, Axel. 2001. "Evolución social en Quebrada de Humahuaca (AD 700-1536)." In *Historia argentina Prehispánica*, Tomo I, edited by Eduardo Berberián and Axel Nielsen, 171-264. Córdoba: Brujas.

73. Nielsen, Axel. 2007. *Celebrando con los antepasados. Arqueología del espacio público en Los Amarillos, Quebrada de Humahuaca, Jujuy, Argentina*. Buenos Aires: Mallku Ediciones.
74. Ogburn, Donald. 2012. "Reconceiving the Chronology of Inca Imperial Expansion." *Radiocarbon* 54 (2): 219-237. https://doi.org/10.2458/azu_js_rc.v54i2.16014
75. Orgaz, Martín, and Norma Ratto. 2013. "Fragmentos del pasado en la ocupación incaica del oeste tinogasteño (Catamarca)." In *Delineando prácticas de la gente del pasado: los procesos socio-históricos del oeste catamarqueño*, compiled by Norma Ratto, 311-336. Buenos Aires: Sociedad Argentina de Antropología.
76. Orgaz, Martín and Norma Ratto. 2015. "Estrategias de ocupación incaica al sur del Tawantinsuyu (Tinogasta, Catamarca, Argentina): la apropiación de paisajes sagrados y la memoria social." *Ñawpa Pacha* 35 (2): 217-235. https://doi.org/10.1080/00776297.2015.1108125
77. Otero, Clarisa. 2013. "Producción, usos y circulación de bienes en el Pucará de Tilcara (Quebrada de Humahuaca, Jujuy)." Unpublished PhD Thesis, Facultad de Filosofía y Letras, Universidad de Buenos Aires.
78. Otero, Clarisa and Clara Rivolta. 2015. "Nuevas interpretaciones para la secuencia de ocupación de Tilcara (Quebrada de Humahuaca, Jujuy)." *Intersecciones en Antropología* 16: 145-159.
79. Ots, María, Nurit Oliszewski, and Jorge García Llorca. 2011. "Estrategias alimentarias y de subsistencia prehispánica en el centro oeste de Mendoza: consumo y descarte en el sitio arqueológico Agua Amarga." *Revista del Museo de Antropología* 4: 65–80.
80. Palamarczuk, Valeria, and Catriel Greco. 2012. "Estilo y tiempo. Un estudio sobre la cronología del estilo cerámico Famabalasto Negro grabado del noroeste argentino mediante dataciones radiocarbónicas." *Estudios Atacameños* 43: 95-120. http://dx.doi.org/10.4067/S0718-10432012000100006
81. Palma, Jorge. 2000. "Urbanismo y complejidad social en la región Humahuaca." *Estudios Sociales del NOA* 3: 31-57.
82. Pärssinen, Martii, Ari Siiriänen, and Antti Korpisaari. 2003. "Fortifications Related to the Inka Expansion." In *Western Amazonia, Multidisciplinary Studies on Ancient Expansionistic Movements, Fortifications and Sedentary Life*, edited by Marti Pärssinen and Aanti Korpisaari, 29-72. Helsinki: Renvall Institute for Area and Culture Studies, University of Helsinki.
83. Patané Aráoz, Claudio. 2017. "El Pucará de Aconquija «que llaman del Inga» y el pueblo de los Malle en la frontera sudoriental del Tawantinsuyu." *Histórica* 41 (2): 7-55.
84. Raffino, Rodolfo. 2004. "El dominio regional: Hualfín y Quillay." In *El Shincal de Quimivil*, edited by Rodolfo Raffino, 121-139. San Fernando del Valle de Catamarca: Ed. Sarquis.
85. Raffino, Rodolfo and Ricardo Alvis. 1993. "El sistema de poblamiento prehispánico." In *Inka. Arqueología, historia y urbanismo del altiplano andino*, coordinado por Rodolfo Raffino, 37-76. Buenos Aires: Ediciones Corregidor.
86. Raffino, Rodolfo, Rubén Iturriza, Anahí Iácona, Aylén Capparelli, Diego Gobbo, Victoria, Montes, and Rolando Vázquez. 1996. "Quillay: centro metalúrgico inka en el noroeste argentino." *Tawantinsuyu* 2: 59-69.

87. Raffino, Rodolfo, Diego Gobbo, Rolando Vázquez, Aylén Capparelli, Victoria Montes, Rubén Iturriza, Cecilia Deschamps, and Marcelo Manassero. 1997. "El Ushnu de El Shincal de Quimivíl." *Tawantinsuyu* 3: 22-39.
88. Raffino, Rodolfo, and Rubén Stehberg. 1999. "Tawantinsuyu. The Frontiers of the Inca Empire." In *Archaeology in Latin America*, edited by Gustavo Politis and Benjamín Alberti, 168-182. London - New York: Routledge.
89. Raffino, Rodolfo, Rubén. Iturriza, Diego Gobbo, Aylén Capparelli, Reinaldo Moralejo, and Cecilia Deschamps. 2004a. "Sinchiwasi." In *El Shincal de Quimivil*, edited by Rodolfo Raffino, 107-119. San Fernando del Valle de Catamarca: Ed. Sarquis.
90. Raffino, Rodolfo, Rubén Iturriza, Diego Gobbo, Victoria Montes, Aylén Capparelli, and Cecilia Deschamps. 2004b. "Kallanka." In *El Shincal de Quimivil*, edited by Rodolfo Raffino, 91-105. San Fernando del Valle de Catamarca: Ed. Sarquis.
91. Raffino, Rodolfo, Diego Gobbo, Rubén Iturriza, Aylén Capparelli, and Cecilia Deschamps. 2004c. "Ushno." In *El Shincal de Quimivil*, edited by Rodolfo Raffino, 69-89. San Fernando del Valle de Catamarca: Ed. Sarquis.
92. Ratto, Norma, and Martín Orgaz. 2009. "Poder, control y volcanes: El estado Inca en el volcán Incahuasi (Tinogasta, Catamarca, Argentina)." In *Entrelazando ciencias: sociedad y ambiente antes de la conquista española*, compiled by Norma Ratto, 157-175. Buenos Aires: EUDEBA.
93. Ratto, Norma, Dolores Carniglia, and Luis Coll. 2012. "Ocupación del área de 'Los Seismiles' desde tiempos Formativos a recientes (Dpto. Tinogasta, Catamarca): nuevas evidencias." *Relaciones de la Sociedad Argentina de Antropología* 37 (1): 207-216.
94. Reynoso, Alejandra, Gerónimo Pratolongo, Valeria Palamarczuk, Marina Marchegiani, and Solange Grimoldi. 2010. "El Calvario de Fuerte Quemado de Yocavil. Excavaciones en los torreones incaicos." In *Arqueología argentina en el Bicentenario de la Revolución de Mayo*, Tomo IV, edited by Roberto Bárcena and Horacio Chiavazza, 1327-1332. Mendoza: INCIHUSA-CONICET - Facultad de Filosofía y Letras (UNCuyo).
95. Rivera Casanovas, Claudia. 2014. "Estrategias de control imperial, movimientos poblacionales y dinámicas regionales durante el período Tardío en la región de San Lucas, Chuquisaca." In *Ocupación Inka y dinámicas regionales en los Andes (Siglos XV-XVII)*, edited by Claudia Rivera Casanovas, 67-9I. La Paz: FEA - Plural editores.
96. Rowe, John. 1945. "Absolute Chronology in the Andean Area." *American Antiquity* 10 (3): 265-284. https://doi.org/10.2307/275130
97. Rusconi, Carlos. 1962. *Arqueología. Poblaciones pre y posthispánicas de Mendoza*, vol. III. Mendoza.
98. Rusconi, Carlos. 1967. "Restos indígenas hallados en una excavación de Las Heras (Mendoza)." *Revista del Museo de Historia Natural de Mendoza "Juan C. Moyano"* 1: 3-13.
99. Schiappacasse, Virgilio. 1999. "Cronología del Estado inca." *Estudios Atacameños* 18: 133–40. https://doi.org/10.22199/S07181043.1999.0018.00011
100. Schobinger, Juan. 2001. "Datación radiocarbónica de la momia del Aconcagua por el Laboratorio Geochron." In *El santuario incaico del cerro Aconcagua*, compiled by Juan Schobinger, 173-177. Mendoza: EDIUNC.

101. Schobinger, Juan. 2004. *El Santuario Inkaico del Nevado de Chuscha (zona limítrofe Salta – Catamarca).* Mendoza: Fundación Ceppa.

102. Schroedl, Annette 2008. "La Capacocha como ritual político. Negociaciones en torno al poder entre Cuzco y los curacas." *Bulletin de l'Institut Français d'Études Andines* 37 (1): 19-27. https://doi.org/10.4000/bifea.3218

103. Stehberg, Rubén and Gonzalo Sotomayor. 2005. "Cultos Inkaicos en el Valle de Aconcagua (Chile Central)." *Xama* 15-18: 279-285.

104. Stuiver, Minzer and Paula Reimer. 1993. "Extended ^{14}C Data Base and Revised CALIB 3.0 ^{14}C Age Calibration Program." *Radiocarbon* 35 (1): 215-230. https://doi.org/10.1017/S0033822200013904

105. Tarragó, Myriam, Luis González., Paola Corvalán, Raúl Doro, Mariano Manasiewicz, and Josefina Peña. 1998-1999. "La producción especializada de alimentos en el asentamiento Prehispánico Tardío de Rincón Chico, Provincia de Catamarca." *Cuadernos del INAPL* 18: 409-427.

106. Tarragó, Myriam, Marina Marchegiani, Valeria Palamarczuk, and Alejandra Reynoso. 2017. "Presencia del inca en Yocavil (Catamarca, Argentina). Integración en la diversidad." *Boletín del Museo Chileno de Arte Precolombino* 22 (1): 95-117.

107. Taylor, Royal. 1987. *Radiocarbon Dating: An Archaeological Perspective*. Orlando: Academic Press.

108. Vera, Sergio, Guillermo De La Fuente, and Kaare Rasmussen. 2019. "Prácticas alfareras, tecnología y cronología durante los períodos Tardío e Inca en el sector meridional del Valle de Abaucán. Tradiciones y rupturas: el caso de Costa de Reyes N° 5 (Tinogasta, Catamarca, Argentina)." *Latin American Antiquity* 30 (1): 70-90. https://doi.org/10.1017/laq.2018.70

109. Waterbolk, Harn. 1971. "Working with Radiocarbon Dates." *Proceedings of the Prehistoric Society* 37: 15-33.

110. Williams, Verónica. 2000. "El imperio inka en la provincia de Catamarca." *Intersecciones en Antropología* 1: 55-78.

111. Williams, Verónica. 2003. "Nuevos datos sobre la prehistoria local en la quebrada de Tolombón. Pcia. de Salta. Argentina." In *Local, regional, global: prehistoria, protohistoria e historia en los Valles Calchaquíes*, edited by Per Cornell and Per Stenborg, 163–209. Gotemburg: Instituto Iberoamericano, Universidad de Göteborg.

112. Williams, Verónica. 2010. "El uso del espacio a nivel estatal en el sur del Tawantinsuyu." In *El hábitat Prehispánico*, edited by Ester Albeck, Cristina Scattolin, and Alejandra Korstanje, 77-114. San Salvador de Jujuy: Facultad de Humanidades y Ciencias Sociales, Universidad Nacional de Jujuy.

113. Williams, Verónica and Terence D´Altroy. 1998. "El sur del Tawantinsuyu: un dominio selectivamente intensivo." *Tawantinsuyu* 5: 170-178.

114. Williams, Verónica, and María de Hoyos. 2001. "El entierro de Agua Verde. Variables bioarqueológicas para el estudio de la complejización social." *Intersecciones en Antropología* 2: 19-34.

115. Williams, Verónica, Alejandra Korstanje, Patricia Cuenya, and Paula Villegas. 2010. "La dimensión social de la producción agrícola en un sector del Valle Calchaquí medio." In *Arqueología de la agricultura*, edited by Alejandra Korstanje and Marcos Quesada, 178-201. Tucumán: Magna.

116. Williams, Verónica and Beatriz Cremonte. 2013. "Paisajes sociales y revalorización de áreas periféricas del noroeste argentino durante la dominación del Tawantinsuyu." In *Al borde del imperio. Paisajes sociales, materialidad y memoria en áreas periféricas del noroeste argentino*, compiled by Verónica Williams and Beatriz Cremonte, 15-35. Buenos Aires: Sociedad Argentina de Antropología.

117. Williams, Verónica, Paula Villegas, and Lía Arechaga. 2013. "Paisaje de Tolombón: ¿de poblado tardío a capital de un Wamani?" In *Al borde del imperio. Paisajes sociales, materialidad y memoria en áreas periféricas del noroeste argentino*, compiled by Verónica Williams and Beatriz Cremonte, 143-176. Buenos Aires: Sociedad Argentina de Antropología.

118. Williams, Verónica and María Castellano. 2014. "Prácticas sociales en las cuencas de Angastaco y Molinos (Salta, Argentina) durante los siglos X al XVI. Resultados preliminares." In *I Jornadas de Investigación y Gestión en el Valle Calchaquí (Salta)*, 69-95. Salta: EUNSA.

119. Wilson, Andrew, Timothy Taylor, Constanza Ceruti, Antonio Chavez, Johan Reinhard, Vaughan Grimes, Wolfram Meier-Augensteing, Larry Cartmell, Ben Stern, Michael Richards, Michael Worobey, Ian Barnes, and Thomas Gilbert. 2007. "Stable Isotope and DNA Evidence for Ritual Sequences in Inca Child Sacrifice." *PNAS* 104 (42): 16456-16461. www.pnas.org/cgi/doi/10.1073/pnas.0704276104

120. Wynveldt, Federico, Bárbara Balesta, Emilia Iucci, Celeste Valencia, and Gabriela Lorenzo. 2017. "Late Chronology in Hualfín Valley (Catamarca, Argentina): A Revision from ^{14}C Dating." *Radiocarbon* 59 (1): 91-107. https://doi.org/10.1017/RDC.2016.114