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# The human colonization of the Southeast Plains of South America: Climatic conditions, technological innovations and the peopling of Uruguay and south of Brazil

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## ABSTRACT

During the late Pleistocene and early Holocene, climatic, faunistic, and ecological changes could produce social readjustments and technological innovations in human populations that were exploring and colonizing the low southeastern plains of South America. In this paper, paleoecological and archaeological data are integrated to systematize and discuss different aspects of early human settlement in Uruguay and the south of Brazil. It is possible to recognize evidence of initial human dispersion by the region between ~14,000 and 13,100 cal BP (12,000 to 11,320 <sup>14</sup>C BP) during the late Pleistocene, when dry and cold climatic conditions prevailed in the region. Later, between 12,800 and 10,065 cal BP, a low plains Paleoamerican stemmed bifacial tradition emerged with three different techno-complexes, represented by Fishtail, Tigre, and Pay Paso projectile points. These groups were adapted to the grassland plains and characterized by the presence of wide-stemmed projectile points. The Fishtail point had been supplanted by the Tigre point, showing diversification in design of projectile points during the Pleistocene–Holocene transition. Approximately 12,000 to 11,200 cal BP in the middle Uruguay River, a social and technological reorganization occurred, along with the emergence of the Tigre techno-complex during post-Fishtail times. The advent of Tigre groups coincided with warmer and wetter climatic conditions, indicating the beginning of the Holocene. By 11,080–10,928 cal BP, new weaponry changes occurred in the region, including the production of the Pay Paso points, a regionally distinctive projectile-point style for the early Holocene. These aspects allow start discussions of cultural transmission, technological innovations and morphological variation in projectile point styles over the time and space. The field research developed over the past 15 years, in conjunction with the previous research conducted in southern Brazil, the relative high density of early sites with radiocarbon ages ( $n = 22$ ), and the chronological base (67 radiocarbon ages), allow to formulate an archaeological and behavioral model about the initial peopling of the Uruguayan and southern Brazil plains.

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## 1. Introduction

The aim of this paper is to present the main paleoclimatic and paleoecological changes that occurred during the initial peopling to evaluate the implication of these changes for the human population and the emergence of cultural readjustments in the Southeast of South America. Additionally, an archaeological and behavioral model for the early peopling of Uruguay and southern Brazil is presented.

The southeastern plains of South America are an ecosystem with high biodiversity, containing an extensive and branched river network with subtropical gallery forests that are located on the banks of rivers, streams and arroyos. During the postglacial, the Pleistocene/Holocene transition, and the early Holocene, significant climatic, ecological, environmental, and faunistic changes occurred (Iriondo, 1999; Prieto, 2000; Zárate, 2003; Ubilla et al., 2004; Behling et al., 2005; Kerber et al., 2014), directly affecting the humans who colonized this region of the continent (Suárez, 2003, 2011a, 2015a, 2016; Bueno et al., 2013). The earliest human occupation dates to 14,000 calibrated years ago (cal BP) with pre-Fishtail occupations (Table 1) (Politis et al., 2004; Politis and Steele, 2014; Suárez, 2014). In these areas, the traces found in

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archaeological sites along the current Atlantic coast and in the middle Uruguay River allow us to infer entry routes and make initial migrant pulses increasingly visible. Three radiocarbon dates from two sites of this period include K87 (Arroyo del Tigre, Fig. 1.1) and Urupez 2 (Fig. 1.6). The RS-IJ-68 site in southern Brazil (Table 1) has some problems such as the weak evidence of cultural association and stratigraphic origin of the sample, for that reason, it is not included here (Bueno et al., 2013:86).

Subsequent to 12,800 cal BP and circa 10,000 cal BP, there is strong and abundant evidence that shows an increase in the visibility and number of early archaeological sites with radiocarbon ages (Table 1). The colonization of this area includes at least three Paleoamerican groups with different stemmed projectile points that indicate cultural diversity existing during the peopling of the low plains of southeast South America. In addition to the classic previously known Fishtail (or Fell) groups (12,800–12,200 cal BP)

**Table 1**  
<sup>14</sup>C ages obtained in early archaeological sites of Uruguay and South of Brazil

Site/country	Radiocarbon date ( <sup>14</sup> C BP)	95% Calibrated age (cal BP) 2σ	Laboratory number	Reference
Urupez 2/Uruguay	12,000 ± 40	13,998–13,627	Beta 394639 <sup>a</sup>	Meneghin, 2015
Urupez 2/Uruguay	11,690 ± 80	13,708–13,292	Beta 211938 <sup>a</sup>	Meneghin, 2006
RS-IJ-68/Brazil	11,555 ± 230	13,791–12,835	SI-3750 <sup>b,c</sup>	Miller, 1987
K87/Uruguay	11,320 ± 40	13,236–13,057	UCIAMS 145429 <sup>a</sup>	unpublished
RS-I-69/Brazil	10,985 ± 100	13,035–12,698	SI-3106 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	10,930 ± 20	12,802–12,705	UCIAMS 21631 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,910 ± 30	12,797–12,698	UCIAMS 27738 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,895 ± 30	12,786–12,693	UCIAMS 27744 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,880 ± 25	12,759–12,692	UCIAMS 27745 <sup>a</sup>	Suárez, 2011a
RS-I-66/Brazil	10,810 ± 275	13,205–11,823	SI-2622 <sup>b</sup>	Miller, 1987
RS-I-69/Brazil	10,800 ± 150	13,034–12,157	N-2523 <sup>b</sup>	Miller, 1987
Urupez/Uruguay	10,800 ± 30	12,733–12,667	Beta 380727 <sup>a</sup>	Meneghin, 2015
Urupez/Uruguay	10,800 ± 40	12,736–12,659	Beta 381967 <sup>a</sup>	Meneghin, 2015
Urupez/Uruguay	10,690 ± 60	12,713–12,436	Beta 165076 <sup>a</sup>	Meneghin, 2006
Pay Paso 1/Uruguay	10,680 ± 20	12,674–12,558	UCIAMS 21637 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,630 ± 25	12,655–12,440	UCIAMS 21636 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,595 ± 30	12,642–12,430	UCIAMS 27746 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,580 ± 20	12,618–12,429	UCIAMS 21644 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,555 ± 20	12,552–12,426	UCIAMS 21645 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,540 ± 35	12,629–12,174	UCIAMS 27747 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,520 ± 20	12,551–12,177	UCIAMS 21643 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,500 ± 25	12,548–12,114	UCIAMS 27740 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,465 ± 30	12,429–12,058	UCIAMS 28692 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,450 ± 25	12,422–12,064	UCIAMS 28682 <sup>a</sup>	Suárez, 2011a
K87/Uruguay	10,420 ± 90	12,552–11,840	KN 2531 <sup>b</sup>	MEC, 1989
RS-I-69/Brasil	10,400 ± 110	12,554–11,773	N-2521 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	10,390 ± 30	12,400–12,001	UCIAMS 27741 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,320 ± 70	12,401–1767	RT 5257 <sup>b</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,285 ± 25	12,051–11,821	UCIAMS 21639 <sup>a</sup>	Suárez, 2011a
RS-I-69/Brazil	10,240 ± 80	12,367–11,404	SI-3106 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	10,225 ± 70	12,251–11,406	RT 5256 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	10,205 ± 35	12,008–11,629	UCIAMS 21632 <sup>a</sup>	Suárez, 2011a
RS-I-69/Brazil	10,200 ± 125	12,384–11,273	N-2522 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	10,180 ± 20	11,974–11,623	UCIAMS 21634 <sup>a</sup>	Suárez, 2011a
RS-I-98/Brazil	10,180 ± 110	12,362–11,268	SI-3752 <sup>b,c</sup>	Miller, 1987
Pay Paso 1/Uruguay	10,115 ± 25	11,795–11,399	UCIAMS 21633 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9890 ± 90	11,700–10,887	no information	Austral, 1995
RS-IJ-67/Brazil	9855 ± 130	11,708–10,763	SI-2637 <sup>b</sup>	Miller, 1987
RS-I-67/Brazil	9840 ± 105	11,608–10,782	N-2519 <sup>b</sup>	Miller, 1987
L. Canosa/Uruguay	9730 ± 30	11,213–10,826	UCIAMS 27739 <sup>a</sup>	Suárez, 2011a
RS-I-69/Brazil	9620 ± 110	11,202–10,590	SI-2631 <sup>b</sup>	Miller, 1987
RS-I-97/Brazil	9605 ± 120	11,205–10,572	SI-3754 <sup>b,c</sup>	Miller, 1987
RS-IJ-67/Brazil	9595 ± 175	11,265–10,299	SI-2637 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	9585 ± 25	11,081–10,711	UCIAMS 21641 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9555 ± 25	11,070–10,685	UCIAMS 21642 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9550 ± 20	11,069–10,679	UCIAMS 21647 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9545 ± 20	11,068–10,666	UCIAMS 21635 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9545 ± 20	11,068–10,666	UCIAMS 21646 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9525 ± 20	11,064–10,595	UCIAMS 21640 <sup>a</sup>	Suárez, 2011a
Pay Paso 1/Uruguay	9525 ± 20	11,064–10,595	UCIAMS 21638 <sup>a</sup>	Suárez, 2011a
RS-I-72/Brazil	9450 ± 115	11,089–10,293	SI-2634 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	9280 ± 200	11,124–9901	Uru-248 <sup>b</sup>	Suárez, 2011a
RS-I-67/Brazil	9230 ± 145	10,752–9915	SI-2625 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	9120 ± 40	10,373–10,176	Beta-156973 <sup>a</sup>	Suárez, 2011a
RS-I-70/Brazil	9120 ± 340	11,185–9471	SI-2632 <sup>b,c</sup>	Miller, 1987
RS-I-99/Brazil	9035 ± 100	10,389–9739	SI-3755 <sup>b,c</sup>	Miller, 1987
RS-S-327/Brazil	8790 ± 40	9901–9560	Beta 160845 <sup>a</sup>	Bueno et al., 2013
ZT-1/Uruguay	8770 ± 30	9887–9554	UGAMS 7459 <sup>a</sup>	Suárez et al., 2011
ZT-1/Uruguay	8750 ± 30	9882–9546	UGAMS 7460 <sup>a</sup>	Suárez et al., 2011
RS-IJ-67/Brazil	8585 ± 115	9898–9274	SI-2636 <sup>b</sup>	Miller, 1987
Pay Paso 1/Uruguay	8570 ± 150	10,119–9093	Uru-246 <sup>b</sup>	Suárez, 2011a
RS-S-C-61-Brazil	8430 ± 50	9520–9282	Beta 260455 <sup>a</sup>	Bueno et al., 2013

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