

## Early High-quality Lithic Procurement in the Semiarid North of Chile

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The identification of high-quality quartz crystal as one of the main lithic resources used at the Quebrada Santa Julia campsite (Jackson et al. 2007; Méndez et al. 2007) motivated a regional search for potential procurement areas and functionally related sites. At Santa Julia, excavations uncovered a 13,100 CALYBP short-term occupation, where quartz crystal was observed to constitute ~40% of the chipping debris and fragments and was the material of two marginally retouched knives (of a total of eight retouched tools) and two

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other bifacial artifacts. Of the latter, one is a fragment of a preform of a fluted projectile point that refits to bifacial-reduction flakes from the same occupation floor. The exceptional quality of this rock, its evident association with megafauna at Santa Julia, and its presence at several other late-Pleistocene and early-Holocene sites across a wide region emphasized the importance of locating its source.

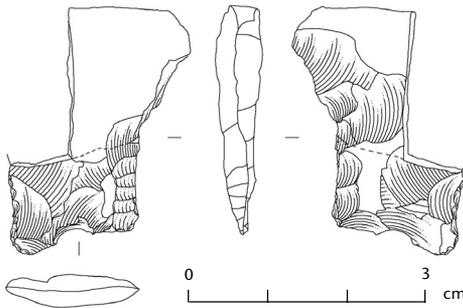
Within the Semiarid North of Chile, Rivano and Sepulveda (1996) previously mapped the regional occurrence of quartz in the inland localities of Caimanes (31° 56' S) and Tilama (32° 05' S), both ~35 km from the coast. Our research team designed and conducted systematic surface surveys along an area linking these two localities, 35 and 40 km from Santa Julia, respectively. Surveys assessed the quality and availability of potential lithic resources and performed archaeological surface sampling.

As for lithic resource occurrence, we sampled 11 localities, identifying mainly white non-translucent quartz rocks. In only two localities did we also observe translucent quartz crystal. This rock is observed mainly as concentrated outcrops ( $n = 7$ ) and only rarely as stratified veins ( $n = 3$ ). Most of the occurrences were of average or below-average chipping quality and were unsuitable for bifacial flaking. Among the places sampled we only observed six cases of modern small-scale mining exploitation and three cases of prehistoric quarrying.

Along the 17 km Caimanes/Tilama transect, surface surveys recorded 24 archaeological sites, primarily concentrated towards the southern area. Among these, at least 11 were identified as late-Holocene settlements on the basis of surface pot sherds as the main material component, and 9 were classified as indeterminable lithic concentrations. Among the other four aceramic sites, we selected Valiente site (CT14) for a preliminary 3-m<sup>2</sup> test excavation.

The site is located on an exposed profile (714 m.a.s.l.) immediately adjacent (~30 m) to a small intermittent ravine (Quebrada Naranjo) and next to one of the most significant currently exploited quartz concentrations. The deposit is composed mainly of clay and sand sediments with conspicuous quartz fragments. The excavations uncovered a ~70-cm deposit with a significant lithic assemblage comprising mainly bifacial debitage and preform fragments on quartz crystal of the highest quality locally available. Within the sample were found two Fishtail projectile-point stems, one of which refitted to a projectile-point preform mid-fragment (Figure 1) located ~150 cm away. Small charcoal particles and unidentifiable charred fragments of mammal bones are present but infrequent in the excavated deposit.

Despite the fact we do not yet have radiometric assays, we expect an early date for the Valiente site, at least contemporaneous with Taguatagua 2 (12,400–10,900 CALYBP), the only site within the wider region of Central and Semiarid North Chile with stratigraphic evidence of quartz crystal Fishtail projectile points (Núñez et al. 1994). Because of its location Valiente is therefore critically important for understanding early lithic procurement in the Semiarid North of Chile. Since Valiente lies 37.4 km away from the terminal-Pleistocene site of Santa Julia, it provides a minimum procurement distance for high-quality toolstone, and informs us about the possible mobility ranges for the earliest hunter-gatherers in the region. Jackson (1998) and



**Figure 1.** Refined fragments of a Fishtail projectile-point preform in quartz crystal from CT14 (upper fragment #304, lower fragment #305).

Galarce (2005) have also recorded quartz crystal at early-Holocene coastal sites with lanceolate projectile points and noted the importance of inland localities for later well-established lithic-procurement strategies in the region.

Nami (2009) has recently noted the recurrence of glasslike crystal quartz in several Fishtail projectile points in localities in Uruguay and other areas of South America, attributing its use to both economic and cultural considerations. Nevertheless, the association of quartz crystal Fishtail and Paján projectile points in Santa María, Perú (Briceño 1999, Dillehay 2000), suggests wider typological variability in the early use of quartz crystal. A similar scenario can be supported for Semiárido North and Central Chile, where the localities mentioned above show both Fishtail and other fluted variations manufactured on this rock, as does the one from Quebrada Santa Julia.

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