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## Obsidian sources and distribution in Patagonia, southernmost South America

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### ABSTRACT

Obsidian artifacts occur in some of the earliest occupied late Pleistocene archaeological sites in Patagonia, such as Pilauco (~15,500 cal BP) in south-central Chile, and Cerro Tres Tetras (~12,100 cal BP) in Santa Cruz, Argentina, and they are very common in numerous early Holocene sites. Trace-element analysis of artifacts from these sites indicate long-distance (>300 to >1000 km) transport of obsidian from nine different sources. Two of these sources, Chaitén (CH) and Nevados de Sollipulli (NS), are associated with active Andean volcanoes in southern Chile. One, around Seno Otway (SO), occurs in the Miocene volcanic belt in the southernmost Andes. The six others, Portada Covunco (PC), Cerro de la Planicies/Lago Lolog (CP/LL), Sacanana (S), Telsen/Sierra Negra (T/SN), Pampa del Asador (PDA) and Cordillera Baguales (CB), occur east of the Andes in Argentina. Geologic ages of these obsidians range from 17.8 Ma (Sacana) to recent (Chaitén). Obsidian from each of these sources is generally homogeneous and chemically distinct from all the other sources. Those from the Chilean Andes are subalkaline in composition, while those from the pampas of Argentina east of the Andes are alkaline and peralkaline. Chaitén obsidian occurs in marine culture sites along the Pacific coast as far as >400 km to the north and south of this volcano, and a few samples has been found >900 km to the southeast along the Atlantic coast, presumably transported there in a canoe. Green obsidian from Seno Otway was also exploited dominantly by marine cultures, but occurs as well in terrestrial hunter-gatherer sites such as Pali-Aike and Fell's caves, from which Junius Bird first reported, in 1938, prehistoric obsidian artifacts in Patagonia. Distinctive black and red-banded "tiger-striped" obsidian from Portada Covunco has also been transported >500 km east to the Atlantic coast, as well as west into Chile and to Mocha Island off the Pacific coast, perhaps because of its aesthetic appeal. Black alkaline obsidian from Pampa del Asador, which includes at least four chemically distinct types, has been distributed by terrestrial hunter-gatherers >800 km northeast to the Atlantic coast and south to Tierra del Fuego, as well as west into Chile. The wide distribution (>300 km) of obsidian from each of these nine sources, well beyond the range considered probable for direct procurement by Patagonian terrestrial hunter-gatherers ( $\leq 200$  km), implies the possibility of a considerable amount of cultural interaction among the prehistoric peoples of Patagonia throughout the Holocene.

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### 1. Introduction

The earliest published mention of obsidian in Patagonia may be that of William Bollaert, captain of the H.M.S. Adventure, who in 1828 described in his log canoe people with obsidian knives in the Strait of Magellan (Crozier, 1996). Another early account of historic obsidian use was that of Enrico Giglioli (1875), who during the 1865–68 voyage of the Italian ship Magenta was given a dark green

obsidian artifact 62 cm in length in the western Strait of Magellan, Chile. San Román and Prieto (2004) suggest that this artifact may be piece #14554 in the Luigi Pigorini National Museum of Prehistory and Ethnography, Rome. Another explorer, George Musters (1871), observed his native guides collecting large pieces of obsidian on September 8, 1869, at a location on the eastern edge of the Pampa del Asador (PDA; Fig. 1; Stern, 1999; Belardi et al., 2006), Argentina. Some years later Clemente Onelli (1904) described a "mine" of obsidian a few kilometers to the west, along the northern edge of this same pampa. Borrero and Franco (2001) report on obsidian arrowheads in the British Museum, London, collected during

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