Background: 1991 Eruptions of Cerro Hudson, Chile

Figure 1. The ice-covered caldera of Cerro Hudson.

Figure 2. Eruption cloud at 19.30 CLT on 8 August 1991 as viewed from Coyhaique, Chile.

Cerro Hudson, Patagonian Andes

Cerro Hudson is a historically active stratovolcano reaching 1905 m above sea level. It in the Chilean Andes, and is related to the subduction of the Nazca plate under the Sou Hudson volcanic complex consists of a 10×7 km caldera (Figure 1) with several vents co ice [*Naranjo et al.*, 1993].

Historical Eruptions

An eruption around 5000 yr B.P. (VEI 6-7) wiped out all existence of early man living i time [Los Toldos archaeological site; *Cardich*, 1985]. On August 12th 1971, Hudson erup plinian column 7-14 km high that dispersed tephra over an area of 60 km^2, causing sign damage. The volcano erupted again on 23rd August 1971, sending a plume to ~6 km. Gl melted and produced lahars that claimed the lives of many people, much livestock and in the Huemules valley (Figure 3; [Smithsonian Global Volcanism Program; *Bitschene*, 1

August 1991 eruption

Cerro Hudson erupted most recently in two separate, partially sub-glacial phreato-pli (starting at 18:20 CLT) and on August 12th 1991 (starting at 12:00 CLT). The first cycle tephra consisting of trachyandesitic and sideromelane glasses. The second cycle was ch eruption of trachyandesitic and ryhodacitic material [*Bitschene & Fernandez*, 1995].

The August 8-9th eruption produced an ash column 7 to 10 km high (Figure 2), which Ash was dispersed by winds to the NNE (Figure 3). Thunder, lightening, black fall-out as were noted at Pto. Chacabuco and Pto. Aisen (Chile) about 30 minutes after the onset melted the capping glacier and produced lahars that traveled down the Huemules Valle blocks up to 20 km from source.

In one of the largest eruptions of the century, Hudson erupted again between August 18 km high. Ashfall was observed on the Falkland islands (~1,000 km SE; Figure 5), and 000 km^2 (Figure 3 and 5). DRE (dense rock equivalent) tephra volume estimates range was deposited in Chile, around 2 km^3 in Argentina, and 2 km^3 may have fallen in the At the atmosphere. Satellite data showed that the eruption produced a large SO_2-rich clou megatons of SO_2 on 16 August, which was transported twice around the globe in 2 wee

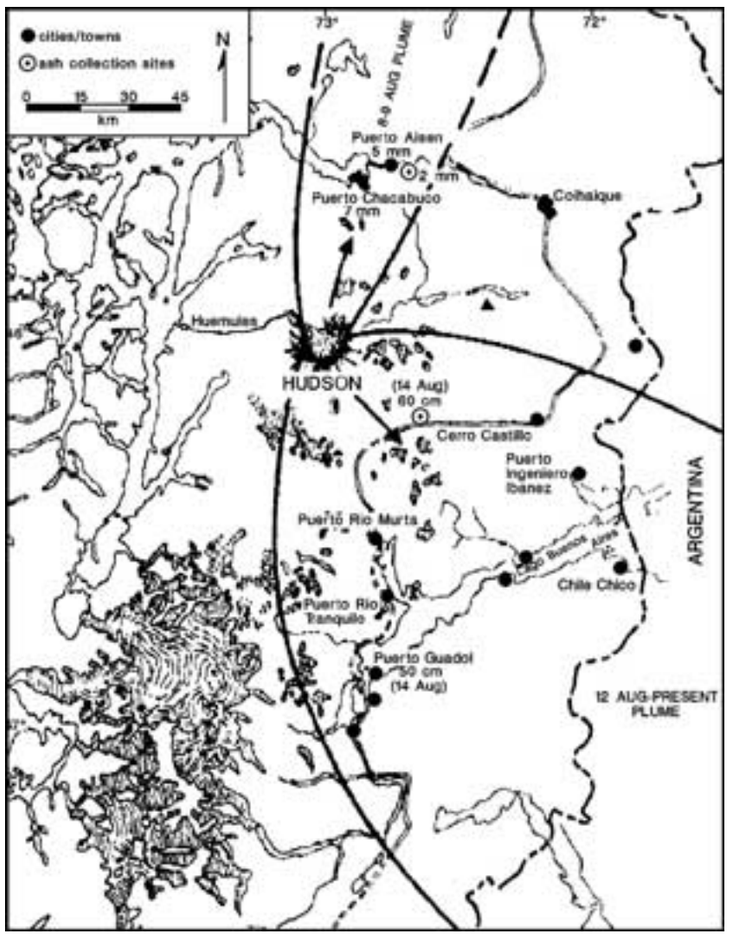

Figure 3. Distribution of ashfall layers from 8-9 and 12-15 August 1991 eruptions.

Figure 4. TIR image of eruption cloud at 1200 GMT on 15 August 1991 (NASA image).

**Figure 5. Isopach map of the 12-15 August ashfall [*Scasso e*

Reworking of deposits

Major reworking of ash deposits in Argentina by strong winds led to several false reports of renewed activity at Hudson in following weeks. Ash was re Comodoro Rivadavia (2 mm at 400 km E of Hudson), and was also reported S to Río Gallegos (700 km SSE) (see fig. 6 for location map). In early Septem ash clouds, probably below 3 km, carried by ground-level winds at 55-65 km/hr: these clouds extended from near the volcano to over the Atlantic ocea appeared to be ~250 km SE of the volcano, about halfway to the Argentine coast. Poor visibility down to only a few hundred meters, was reported at P These suspended dust veils impacted airline traffic for many months after the eruption.

Images of proximal to medial sections 9 years later

Figure 6a. Río Ibáñez valley (Chile) in August 2000. Tephra fall-out from the 1991 Hudson eruption "clogged the river, causing it to spread out over more than a mile in width, and the combination of water and toxic ash content killed thousands of trees and the fish. The ash plume extended to the watersheds for Lago General Carrera (Chile), and caused some silting in on a portion of the lake."

Figure 6b. Area adjacent to Río Ibáñez valley (Chile) in August 2000. The top of th ground prior to the 1991 Hudson eruption.

Images and witness report can be found at: http://www.geocities.com/foraster/aug0

Population Statistics

Figure 7. Provincia de Santa Cruz (click on map for larger image).

District	1991			2001	
	Population	Surface Area km^2	Density people/km^2	Population	Surface km^2
Total	**159,839**	**243,943**	**0.7**	**196,958**	**243**
Corpen Aike	7,045	26,350	0.3	7,942	26
Deseado	56,879	63,784	0.9	72,953	63
Güer Aike	79,032	33,841	2.3	92,878	33
Lago Argentino	3,940	37,292	0.1	7,500	37
Lago Buenos Aires	4,975	28,609	0.2	6,223	28
Magallanes	5,314	19,805	0.3	6,536	19
Río Chico	2,654	34,262	0.1	2,926	34

Source: INDEC. Censo Nacional de Población y Vivienda 1991 y Censo Nacional de Población, Hogares y Viviendas 2001 e Instituto Geográfico Militar.

Table 1. Population statistics for Provincia de Santa Cruz: 1991 and 2001.

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