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# Short note
# Jurassic trees at Jason Peninsula, Antarctica

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Jason Peninsula (66°10'S, 61°00'W) is a prominent feature extending some 80 km into the Larsen Ice Shelf from the eastern coast of the Antarctic Peninsula, and consists of widely spaced rock exposures and several ice-domes with elevations up to some 600 m (Fig. 1). The feature was first seen from seaward on 1 December 1893 by Captain C.A. Larsen, who named one of the high summits "Mount Jason" after his ship. Leading the 1902–1904 Swedish Antarctic Expedition, Dr Otto Nordenskjöld observed the area from Borchgrevink Nunatak (66º03'S; 62º30'W) and reported that the summits seen by Larsen were separated from the Antarctic Peninsula. The name "Jason Island" was subsequently adopted for this feature, but in the 1950s researchers belonging to the currently named British Antarctic Survey (BAS) determined Larsen´s discovery to be a large peninsula, underlain mainly by calc–alkaline volcanic rocks.

Further investigations carried out independently by BAS and Instituto Antártico Argentino (IAA) confirmed that the rocks exposed on Jason Peninsula are dominated by Jurassic calc–alkaline pyroclastic rocks, together with basaltic intrusions at Manteiro (66°04'S, 61°25'W) and Villacian nunataks (66°14'S, 61°32'W), with alkalic basalts forming a Recent volcanic cone at Argo Point (Fig. 1).

According to Saunders (1982), the isotopic dates determined by Rex (1976, table III) on intrusive basalts from the northern side of the Jason Peninsula suggest a "minimum Jurassic age" for the main volcanic sequences (Table I). The results of petrographic and geochemical analyses of alkalic basalts from Argo Point and calc–alkaline volcanic rocks from BAS locality R.218 were published by Saunders (1982) with a brief account of the geology of Jason Peninsula.

Recently del Valle *et al.* (1992) emphasised that Jason Peninsula seems to be an uplifted area dividing the Mesozoic sedimentary basin located on the continental shelf east of Antarctic Peninsula (Larsen Basin; Macdonald *et al.* 1988) into two sub-basins, the northern one named James Ross Basin and the southern one as yet unnamed. Since 1988 the IAA has been carrying out a research programme to improve the geological and geographical knowledge of Jason Peninsula, including geological sampling and the acquisition of GPS data for precise mapping. A brief report on the main features of some rocks from Ramírez Nunatak (66°10'S, 61°50'W) was given by del Valle (1991), who classified them as ignimbritic rocks and tuffs of dacitic composition.

During the 1994 and 1996 IAA winter expeditions, aimed at correlating sequences cropping out on the western part of Jason Peninsula, remains of petrified tree trunks were found within the following isolated and poorly exposed sequences of volcaniclastic rocks cropping out at Brebbia (66°14'S, 61°50'W) and Ramírez nunataks.

1) Brebbia Nunatak: approximately 10 m of gently N-dipping cross-bedded volcanic sandstones grading into laminated tuffs.

2) Ramírez Nunatak: a sequence approximately 125 m thick and dipping 6–8° ENE; a 50 m thick tuffaceous lower section, composed of a graded succession of yellow-green volcanic sandstones and tuffs, similar to those cropping out at the Brebbia Nunatak, is covered by a 75 m thick upper ignimbritic section.

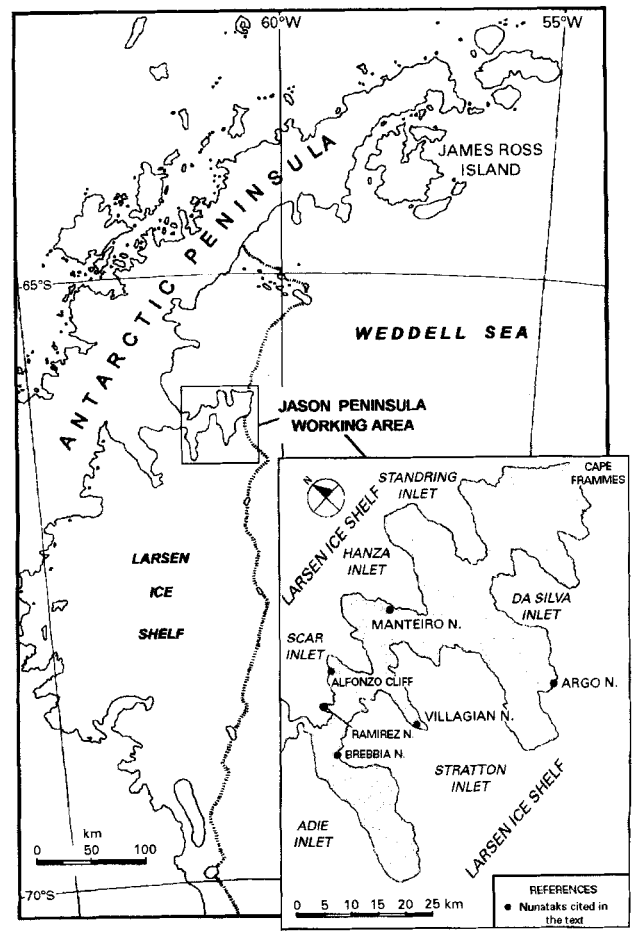


**Fig. 1.** Schematic map of the Antarctic Peninsula showing the location of Jason Peninsula.

**Table I.** Potassium–Argon age data (whole rock analyses)

| Locality | Lat. Long. | Rock type | Analysis ref. no. | Age (Ma) |
|---|---|---|---|---|
| Jason Peninsula[1] | 66°05'S, 61°21'W | Basalt | IDC293 | 186±8 |
| Jason Peninsula[1] | 66°05'S, 61°21'W | Basalt | IDC301 | 156±6 |
| Ramírez Nunatak[2] (Jason Peninsula) | 66°10'S, 61°50'W | Ignimbrite | No. 555 Ref. 1405 | 186±8 |
| Ramírez Nunatak[3] | 66°10'S, 61°50'W | Ignimbrite | Sample 3688 Report 3449 | 183±8 |
| Brebbia Nunatak[2] (Jason Peninsula) | 66°14'S, 61°50'W | Ignimbrite | No. 564 Ref. 1455 | 190±8 |
| Brebbia Nunatak[3] | 66°14'S, 61°50'W | Dacitic tuff | Sample 3689 Report 3450 | 191±9 |
| 'Alfonzo Cliffs'[2] | 66°07'S, 61°47'W | Tuff | No. 487 Ref. 1286 | 157±3 |
| 'Alfonzo Cliffs'[2] | 66°08'S, 61°48'W | Tuff | No. 492 Ref. 1286 | 161±3 |
| Manteiro Nunatak[3] (Jason Peninsula) | 66°04'S, 61°25'W | Basalt | Sample 3690 Report 3451 | 230±9 |

[1] Rex (1976).
[2] Analyses by Instituto de Geocronología y Geología Isotópica (INGEIS), Argentina. Reference numbers: Linares & Gonzalez (1990).
[3] Analysis INGEIS 1994.

Two samples of volcaniclastic rocks obtained at Brebbia Nunatak were dated at 190 and 191 Ma, and two from Ramirez Nunatak were dated at 183 and 186 Ma. Two further samples of reddish to green dacitic tuffs from a 130 m high cliff informally named "Alfonzo cliffs" (Fig. 1) yielded ages of 157 and 161 Ma (Table I).

Fossilized stems are abundant in the uppermost part of the tuffaceous section, and trunks are present in the lower part of the ignimbritic section at Ramírez Nunatak. Stems and tree trunks were found within the tuffs at Brebbia Nunatak. The large tree trunks are about 50 cm in diameter. Because they occur within welded and poorly bedded volcaniclastic rocks, they break off into small 'logs' when sampled (Fig. 2). Most are badly exposed and lay with their maximum length near parallel to bedding, making it difficult to observe the complete trunks, and to estimate their total length.

Although the tree trunks are not in life position, they may be considered as 'logs' sheared off by ash-flows and transported only a short distance. The finding of stems and trunks within subaerial ignimbrites and tuffaceous rocks dated between 183–191 Ma (Table I) at Ramírez and Brebbia nunataks (Fig. 1), suggests that during Jurassic times large trees probably covered part of Jason Peninsula, and were catastrophically buried by subaerial ignimbrite eruptions. Although the plant remains are unlikely to have primary stratigraphic value, the volcaniclastic rocks containing the fossils and other associated tuffs (Alfonzo cliffs) have yielded early–late Jurassic isotopic ages (Table I), suggesting that the fossil plants are likely to correlate with Gondwanian floras.

The terrestrial plants remains and the subaerial character of eruptions that generated the rocks containing the fossil flora lead us to propose that Jason Peninsula was a positive region with considerable relief supporting well developed vegetation during Jurassic times. It is likely that it provided an important source area of volcaniclastic debris to Larsen Basin (del Valle *et al.* 1992).

**Fig. 2.** A tree trunk fragment sampled at Ramírez Nunatak. The ignimbritic rock hosting the trunk is partially shown at left side. The hammer is 33 cm long.

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