



## **Volcanically far-flung lake sediments in New Zealand and their diatom contents.**

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Explosive volcanic eruptions from the Taupo Volcanic Zone in New Zealand such as the Okaia (28.6 ka) and Oruanui (25.4 ka) through paleolake Huka and the Taupo eruption (1.8 ka) through paleolake Taupo dispersed measurable quantities of diatom valves (remains of siliceous microscopic algae) along with the tephra (Van Eaton et al. 2013). Diatoms preserved in tephra can inform us about the past histories of freshwater floras and lakes. For instance the possibly extinct endemic diatom *Cyclostephanos novaezealandiae* is 20 times commoner in the Late Pleistocene Oruanui and Okaia tephtras than in recent lake sediment. We also found *Aulacoseira* valves (mainly *A. ambigua*) were generally shorter in the older tephtras, possibly due to more turbid conditions in the glacial period due to stronger winds or less availability of nutrients.

Some information on eruptive processes can also be derived from diatoms. Nearly all diatom assemblages in the Oruanui samples were remarkably similar, indicating they were well mixed by turbulence in the eruptive column. The exceptions were a proximal sample (11 km from vent) and the clasts of slightly older lake sediment enclosed in the ignimbrite. One clast was dominated by different *Aulacoseira* taxa (*A. granulata* and *A. granulata* var. *angustissima*). A vent in a shallower area of paleolake Huka could well have been the source of these diatoms. The proximal sample was deposited early in the eruption and on a ridge close to the rim of the paleolake, and is also likely to have come from a local vent.

Caution should be used in interpreting diatoms in phreatomagmatic tephra in lake basins. Earlier Harper & Collen (2002) interpreted diatoms associated with the Okaia and Oruanui tephtras in the Poukawa basin (125 km from vent) as indicating the existence of lakes formed when drainage was blocked by the tephra. However the strong resemblance of the assemblages and morphometry of *Aulacoseira* valves to those measured in our new samples shows they arrived with the tephra.

Diatoms dispersed by volcanic eruption through lake sediment and subsequently preserved in tephra have the potential to supply information about past lake environments.

Harper, M. A. & Collen, J. D. 2002. *Global and Planetary Change* 33: 243-256.

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