Magmatic variety through tectonic modulation of the 27 ka Oruanui eruption, Taupo, New Zealand

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Deposits of the earliest three phases (of 10) in the 530 km^3 magma, 27 ka Oruanui eruption reflect shifting vent positions and accompanying variations in compositional diversity [1, 2]. New data reveal close connections between changing vent positions and magma chemistries, involving a tectonic modulation of the eruption dynamics, thus.

1) Start of phase 1 of the eruption. Through all of the phase 1 deposits, pumice clasts from a crystal richer, biotite-bearing rhyolite magma are found that encountered the main (biotite-free) Oruanui magma in the conduit. Biotite-bearing pumices occur at 2-4% abundance, increasing to 16-17% in the uppermost phase 1 deposits. Thermobarometric constraints in combination with glass chemistry and *in situ* trace element fingerprinting of amphibole and plagioclase source this magma to an adjacent system which erupted at ~28 ka from vents ~15 km northeast of the Oruanui phase 1 vent area. This adjacent system operated entirely independent of the Oruanui magmatic system for >20 kyr prior to the 27 ka eruption and no connection was previously inferred. Lateral transport of the biotite magma is indicated, implying that a rifting event accompanied/controlled the start of the Oruanui eruption.

2) Shutdown of the phase 1 vent. After <0.1% of the Oruanui magma volume had been discharged, activity ceased for several weeks to months, despite the underlying presence of ~530 km^3 of gas-saturated rhyolite magma.

3) Renewal of explosive activity (phase 2) from the same vent site, with a renewed influx of biotite-bearing rhyolite from the adjacent independent magma system, indicating that another rifting event and dike emplacement occurred.

4) Rifting-related unzipping of new vents aligned down the E side of modern Lake Taupo in phase 3, coincident with the first appearances of high-silica (roof cupola) rhyolite and low-silica rhyolite dredged from the magma chamber roots, a spike in the abundance of juvenile mafic material and a marked increase in the tempo of the eruption.

[1] C.J.N. Wilson (2001) *J. Volcanol. Geotherm. Res.* **112**, 133-174. [2] C.J.N. Wilson *et al.* (2006) *J. Petrol.* **47**, 35-69.

Nd isotopes vs magnetic susceptibility as a double proxy for paleoclimate and paleoweathering: The Kerguelen Case

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In a seminal paper, Kent (1982) has shown that the magnetic susceptibility (MS) measured in a sediment core near the Kerguelen Island, fluctuated coherently with $\partial^{18}0$. Those variations translate the climatic change between glacial and interglacial periods. Since MS variations also fluctuate with $CaCO_3$ content (high carbonate correlates with low MS), Kent interpreted the MS variations as a dilution effect induced by $CaCO_3$. However, when we corrected MS from carbonate dilution, the fluctuations persisted and still correlated with $\partial^{18}0$. Thus, if indeed the carbonate dilution plays a role, it is not the ultimate reason for the climatic variation of MS.

We also measured both the Nd isotopic composition (ε_{Nd}) of ancient seawater and of the detrital fraction of the sediment, which is related to the local erosion. Interestingly, in this region, ε_{Nd} of ancient seawater varies with climate in coherence with MS and $\partial^{18}0$, whereas very small variations are seen on the detrital ε_{Nd}. This difference will be discussed in detail.

We will show that oceanic currents were much more active during Interglacials than Glacials and that in the region mechanical erosion and chemical erosions were also more active during Interglacials.