

## Re-Os depositional age and geochemistry of the late Paleocene Waipawa Formation, New Zealand

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The Late Paleocene Waipawa Fm. is an organic-rich marine mudstone that has received considerable attention due to its significance for demystifying the Early Paleogene transitional climate of the southwest Pacific. Precise dating of the formation, however, has so far been complicated by factors such as intermittent distribution of fossils, unconformities and lack of reliable paleomagnetic data [1]. Here, Re-Os isotope geochronology yields the first precise radiometric age of the formation (ca. 58 Ma), that confirms its proposed biostratigraphic age [1]. Comparison of Re-Os, sulphur and bulk pyrolysis data of the Waipawa Fm. with those of the underlying Whangai Fm. provide further insights into the mechanistic controls of Re-Os systematics in organic-rich sediments. The Waipawa Fm. exhibits a limited range in both  $^{187}\text{Re}/^{188}\text{Os}$  and  $^{187}\text{Os}/^{188}\text{Os}$  which is attributed to little variation in its organic matter type. It is also enriched in Re and Os despite exhibiting high sedimentation rates (~10.57 cm/ky).

The initial  $^{187}\text{Os}/^{188}\text{Os}$  values of the Waipawa (0.28) and Whangai (0.35) formations add to a low resolution marine  $^{187}\text{Os}/^{188}\text{Os}$  curve for the Paleocene that highlight a gradual shift to non-radiogenic  $^{187}\text{Os}/^{188}\text{Os}$  values following recovery from the Chicxulub impact event. In particular, the  $^{187}\text{Os}/^{188}\text{Os}$  value of 0.28 at ca. 58 Ma defines a minima before the marine  $^{187}\text{Os}/^{188}\text{Os}$  increases again leading up to the Paleocene-Eocene boundary. Possible sources of the non-radiogenic Os includes emplacement and weathering of the Papuan Ultramafic Belt ophiolite and the first eruptive phase of the North Atlantic Igneous Province.

[1] Hollis *et al.*, (2014), *Earth-Science Reviews*, **134**, 81-97.