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Does dust contribute to changes in organic carbon export to the deep sea during the Miocene Climate Optimum in the eastern Equatorial Pacific?

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Significant and relatively abrupt variations in the carbon (C) cycle occurred during the Miocene Climate Optimum, ~17 to 14.7 million years ago (Ma), a time period considered to be a potential paleo-analogue of future conditions on Earth due to current increases in atmospheric pCO_2. We present a new record of organic C export to the deep sea from barite extracted from marine sediment in the eastern equatorial Pacific (EEP) at International Ocean Discovery Program (IODP) Site U1337 to test the impact of terrigenous inputs into the ocean – specifically dust on organic C export. The EEP is one of the largest regions of high primary productivity on Earth and the major region of ocean CO_2 efflux to the atmosphere today because organic C export to the deep sea does not compensate the outgassing of CO_2 from upwelling. Robust records of change in organic C export – one part of the marine biological carbon pump – and dust flux is needed to test whether or not increases in dust drove increases in organic C export in the EEP at this time. New extraterrestrial 3He concentrations were measured on the same samples as barite from 16.94 – 16.46 million years ago to reconstruct the accumulation of barite and other XRF elemental-proxies at high resolution. Concentrations of 4He are also presented as an independent record of eolian dust delivery to compare with XRF Ti, Al and Fe records.