

Distribution and fractionation of rare earth elements along the Jurien Bay dune chronosequence

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The distribution and fractionation of rare earth elements (REE) were investigated in 45 samples (topsoil and subsoil) from 3 sites along the Jurien bay chronosequence: a 2 million-year coastal dune chronosequence with a species-rich Mediterranean shrubland in the Southwest Australian Biodiversity Hotspot [1].

Although, a wide range of natural variability in REE content was observed, overall the REE median contents were relatively low to very low compared with those reported in soils from other parts of the world. The REE contents in the Jurien Bay soils showed significant correlation mainly with Ca and Mg, as well as carbonate content. REE distribution in soils depends on the parent material, while fractionation of individual REEs depends on soil characteristics that are partly influenced by pedogenic processes [2]. Soils developed from calcareous sand showed lowest average content of REEs compared with residual quartz sand (a parent material that contains less carbonate). REE normalized patterns thus varied significantly within each geological formation. The greatest variations were observed in the heavy REEs. These latter variations can be explained by a sand decarbonation along the chronosequence which results from weathering of the sedimentary material. Overall, this process generates an REE enrichment over time.

[1] Turner B.L., Laliberté E. (2014). *Ecosystem* 18, 287-309.

[2] Vermeire M.-L., et al. (2016) *Chemical Geology* 446, 163-174.