

Two PhD positions in dunefield evolution and paleoclimate in Fraser Island, Queensland, Australia

Fraser Island World Heritage Area (<http://whc.unesco.org/en/list/630>) and the Cooloolo Coast, on the south-east Queensland coast, form the terminus of the longest downdrift sand system on the planet. Giant podzols (extending to 25 m depth) have formed over the long weathering history of the sand dunes in this system, containing buried and truncated soil profiles as a result of periods of dune erosion and building in response to climate change and sea level fluctuations. These dunefields therefore contain one of the best archives on environmental change in the Australian sub-tropics. Two PhD positions are being offered as part of a larger project, based at the University of Queensland, combining geomorphology, geology, geochemistry, sedimentology, and paleoclimatology to test exactly how these large sand islands form over millennial timescales. It will also contribute critical information to debates on inter-hemispheric climate connectivity and the climate impacts of cyclones and oscillatory climate systems.

Position 1: Using multiple geochemical tracers to unravel the environmental history of the sub-tropics using massive sand island soil archives (University of Queensland, Brisbane)

Geochemical and mineralogical characteristics of the giant podzols present in Fraser Island's dunefields will be investigated to understand processes of dune building and erosion in relation to climate and sea level over scales from decadal to multi-millennial. Techniques including stable isotope composition of organic matter, trace and rare earth element partitioning, and quantitative mineralogy will be used to examine soil development and environmental change as these large sand islands respond to changing sea levels and climate. The candidate will be working directly with Drs Josh Larsen, Talitha Santini and Kevin Welsh (all UQ) and as part of a larger international team of earth scientists. To apply for this position, please submit a cover letter, CV (containing publications and grants history, and contact details for three referees), and completed Expression of Interest (available from postgrad.gpem@uq.edu.au) form to Dr Talitha Santini (t.santini@uq.edu.au) by 24 April 2015. For entry requirements and eligibility queries, please refer to <http://www.uq.edu.au/grad-school/our-research-degrees>.

Position 2: Dunefield evolution, coastal processes and climate change (Flinders University, Adelaide)

Utilising a detailed GIS analyses of time-series vertical aerial photographs, lidar and high resolution geomorphological mapping, and stratigraphic and sedimentological data, this study will explore recent (last 100 years) and Quaternary development of the Fraser Island dunefield. The study will examine interdecadal changes in climate variables that control rainfall, storminess and winds and determine the timing and origin of the last coastal dunefield transgression (or active phase) that ended by the early 1980's when vegetation cover began to rapidly increase on Fraser Island. We expect that this detailed information obtained from the recent record will contribute to the study of palaeo-climate shifts and the impacts on coastal dunefields. The study will also examine longer term (Holocene to Quaternary) development of the dunefield system. The candidate may choose to conduct a Ph.D on either recent or Holocene/Quaternary research and he/she will be working directly with Professor Patrick Hesp and Dr Graziela Miot da Silva (both Flinders University) as part of a larger international team of earth scientists. To apply for this position, please submit a cover letter, CV (containing publications and grants history) and contact details for three referees to Dr Graziela Miot da Silva

(miot0004@flinders.edu.au) by 24 April 2015. For entry requirements and eligibility queries, please refer to <http://www.flinders.edu.au/research-degrees/how-to-apply.cfm>

Extensive fieldwork is a highlight of these projects and field trips of one to two weeks to the Cooloola and Fraser Island field sites will be conducted as part of both positions. The ideal candidate(s) will have a background in one or more of soil science, geology, earth sciences, GIS, physical geography/geomorphology, geochemistry, hydrology or other cognate discipline/s. The project is supported through an Australian Research Council Discovery Grant. The candidate(s) will be expected to secure an Australian Post-graduate Award PhD Scholarship (APA) (for Australian or New Zealand candidates) or an International Postgraduate Research Scholarship (IPRS) (for outstanding international students), both ca. AUD \$24,500 a year tax-free. For further information on scholarships please refer to <http://www.uq.edu.au/grad-school/scholarships-and-fees> (Position 1) and <http://www.flinders.edu.au/research-degrees/scholarships-and-fees.cfm> (Position 2). An AUD \$5,000 a year top-up scholarship for each position will be available through the project. There is substantial funding to support an extensive field and laboratory campaign and access to state-of-art techniques and equipment.