

Seeking a Postdoctoral Fellow: Purkis Lab, University of Miami



Prof. [Sam Purkis](#) is seeking a full-time postdoctoral fellow for at least one year, to be based at the [Rosenstiel School of Marine, Atmospheric, and Earth Science](#), situated within the [University of Miami](#).

BACKGROUND: This project will study hydroclimate and watershed dynamics in the “NEOM” area which encompasses the mountainous region of the northern Red Sea and Gulf of Aqaba. The past is highly relevant for modern climate change because it helps us to understand the mechanisms regulating climate and, therefore, to correctly attribute the relative importance of the many factors contributing to climate change, including natural and anthropogenic forces.

Key in the Middle East is the trajectory of increased temperature and aridity, interspersed with an increasing frequency of extreme weather – specifically winter rain/flood events. These extreme events deliver copious quantities of sediment onto nearshore reefs via wadi networks. Since sediment stifles reefs, understanding the frequency of extreme weather is crucial for understanding the spatial distribution of reef resilience, but will also yield important lessons for the urbanization of the Red Sea coastline with regard to the risk of flash floods.

In the spirit of ridge-to-reef, the project will consider the wadi network of the NEOM watershed. This network is key to understanding the movement of sediment into the coastal zone and the flood risk posed by high-magnitude low-frequency flood events.

The candidate will use high-resolution remote sensing to: (i) create digital terrain models of the terrestrial NEOM area, and (ii) to map the wadi watershed. Time-separated remote sensing and field sampling will be combined to ascertain which wadi networks are presently active versus inactive. Runoff data and catchment parameters will be modelled to generate flood-hazard susceptibility maps.

These data and the models they will support will be integrated into the paleoclimate record constructed from a series of deep-sea sediment cores collected in collaboration with OceanX in the northern Red Sea and Gulf of Aqaba. From these cores, we have established that we can access an archive of oceanographic and climatic extremes, as well as certain geohazard events (earthquakes, tsunamis, floods), at unprecedented fidelity. The cores are located under the core of the subtropical winter jet, which lies at the northern edge of the tropics, and hence is a key constraint on tropical expansion/contraction with climate change.

The postdoctoral fellow is expected to assemble remote sensing datasets and independently develop code for computer simulations, to perform quantitative analysis, write peer-reviewed publications, reports, and assist in the ideation of proposals.

I seek a highly numeric candidate and favorably view a background in remote sensing, GIS, watershed modelling, and computer science.

Key factors in my hiring decision will be creativity, motivation, and productivity.

For further information, contact Prof. Sam Purkis (spurkis@earth.miami.edu). Chair – Department of Marine Geosciences – Rosenstiel School of Marine Atmospheric, and Earth Science, University of Miami.