Igniting flare-up events in Sistan Suture Zone, Iran

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Sistan Suture Zone (SSZ) was undergone a number of important short-lived tectonic events from the middle Cretaceous to recent: (i) rifting of a large continental mass in the middle Cretaceous produced the Lut and Afghan blocks with an intervening marine basin (flysch) accumulated; (ii) northeastward subduction under the Afghan block by the Maastrichtian; (iii) collision between the Lut and the Afghan blocks terminated subduction by the middle Eocene; and continued convergence between the Lut and Afghan blocks resulted in widespread conjugate strike-slip faulting [1]. Zahedan–Saravan granitoides are parts of SSZ and occurred after closure of the ocean with a northwest–southeast trend (figure). The granitoides can be separated into two groups based on detailed age, major and trace-element geochemistry and field work. They are dominated by biotite granites at about 50km away from subduction place (ophiolitic rocks) with ~ 43Ma in age and granodiorites at 70-90km away from subduction place with 30Ma in age. The granitoides were cut by lots of andesitic and rhyolitic dykes at ~ 29Ma before they completely cold. U–Pb dating and geochemical analyses reveal: (1) a shift between the ages of biotite granites near the subduction place and the granodiorites farther than biotite granites from the subduction place; (2) Relative to granodiorites, biotite granites are richer in CaO, MgO, TiO_2, Ni, Cr, Co, Zr, Yb, Cs and Lu; and (3) an apparent flare-up in the SSZ from 43 to 29Ma.

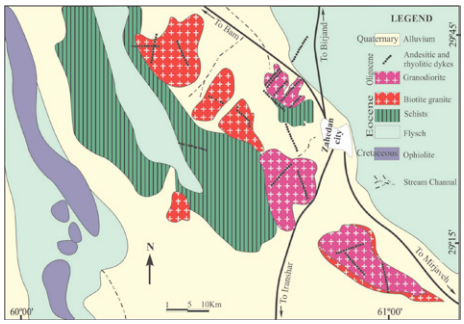

Figure: Geological map of Zahedan–Saravan granitoides.

[1] Tirrul *et al*. (1983) *Geol Soc Am Bull* **94,** 134-150.

Dependence of Sulfur Cycling and Mobility in Peat Soil on the Water Table Regime

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Water table fluctuations change the soil redox environment and hence, affect the metabolism of electron donors and acceptors by the native microbial community. To investigate the role of water table dynamics on biogeochemical transformations and fluxes in soils, an automated column system was developed to simulate the interactions between groundwater and surface waters under controlled conditions. In this system, the position of the water table is imposed using a computer-controlled, multi-channel pump connected to a hydrostatic equilibrium reservoir and a water storage reservoir. We compared two water table regimes: i.e., fast (4 days) vs. slow (16 days) water table fluctuations. The pulse of oxygen introduced by lowering the water table caused a partial and temporal oxidation of previously reduced species. As expected, draining and rewetting of the soil columns resulted in a significant re-oxidation of reduced sulfur species, changes in pore water SO_4^{2-} concentration and microbial sulfate reduction rates. However, the dual-porosity structure of the peat soil was found to strongly modulate the sulfur cycling and mobility. This study supports the importance of water table dynamics and soil texture on biogeochemical functioning of peat soil environment.

DOI:10.1180/minmag.2013.077.5.18