

General Theme 3

3.5

Earth surface environments were starkly different during the Precambrian than today. Reconstructing these ancient environments is challenging, but powerful constraints can be made by reading the sedimentary record. For example, the Great Oxidation Event was originally hypothesized based on changes in the distribution of redox-sensitive minerals in clastic sediments during the Archean and Proterozoic. This hypothesis was later tested with novel geochemical techniques, such as measurement of mass-independently fractionated sulfur isotopes in sedimentary sulfates and sulfides. Similarly, late Proterozoic global glaciations were originally inferred based on the widespread occurrence of glacially deposited sedimentary rocks of this age and subsequently validated by paleomagnetic analyses, which demonstrated that glaciers reached sea level in the low latitudes. The purpose of this session is to share new observations from the Precambrian sedimentary record that elucidate ancient environments and to present new data or analytical approaches aimed at deriving paleoenvironmental data from the sedimentary rock record. Topics include, but are not limited to, the evolution of atmospheric oxygen levels and ocean redox conditions, evidence of catastrophic climate change, and interactions between the biosphere and sediments. We specifically encourage papers on studies that couple detailed analysis of the sedimentary record with innovative analytical techniques or interpretations.