



Accelerating Neoproterozoic Research through Scientific Drilling

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The Neoproterozoic Era (1.0 to 0.541 Ga) and earliest Cambrian (541 to ca. 520 Ma) records geologic changes unlike any other in Earth history: supercontinental tectonics of Rodinia followed by its breakup and dispersal into fragments that form the core of today's continents; a rise in oxygen that, perhaps for the first time in Earth history, resulted in the deep oceans becoming oxic; snowball Earth, which envisages a blanketing of global ice cover for millions of years; and, at the zenith of these combined biogeochemical changes, the evolutionary leap from eukaryotes to animals. Such a concentration of hallmark events in the evolution of our planet is unparalleled and many questions regarding Earth System evolution during times of profound climatic and geological changes remain to be answered.

Neoproterozoic successions also offer insight into the genesis of a number of natural resources. These include banded-iron formation, organic-rich shale intervals (with demonstrated hydrocarbon source rocks already economically viable in some countries), base and precious metal ore deposits and REE occurrences, as well as industrial minerals and dimension stone. Developing our understanding of the Neoproterozoic Earth-system, combined with regional geology has the potential to impact the viability of these resources.

Our understanding of the Neoproterozoic and early Cambrian, though, is overwhelmingly dependent on outcrop-based studies, which suffer from lack of continuity of outcrop and, in many instances, deep weathering profiles. A limited number of research projects study Precambrian strata have demonstrated the potential impact of scientific drilling to augment and complement ongoing outcrop based studies and advancing research. An ICDP and ECORD sponsored workshop, to be held in March 2014, has been convened to discuss the utility of scientific drilling for accelerating research of the Neoproterozoic through early Cambrian (ca. 0.9 to 0.52 Ga) rock record. The aim is to discuss the potential for establishing a collaborative, integrated, worldwide drilling programme to obtain the pristine samples and continuous sections needed to refine Neoproterozoic Earth history, inform assessment of resource potential, and address the major questions noted above. Such an initiative would be a platform to define complementary research and discovery between cutting-edge interdisciplinary scientific studies and synergistic collaborations with national agencies (Geological Surveys) and industry partners. A number of potential sites have been identified and discussed, along with identifying the mechanisms by which the Neoproterozoic research community can development data archives, open access data, sample archiving, and the approaches to multi-national funding. We will, amongst other things, present a summary of the workshop discussions.

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