[EE] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG55]Various interactions between solid Earth and climates

convener:Takashi Nakagawa(JAMSTEC/MAT), Yusuke Yokoyama(Atmosphere and Ocean Research Institute, University of Tokyo), Jun'ichi Okuno(国立極地研究所, 共同), Tadashi Yamasaki(National Institute of Advanced Industrial Science and Technology)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session aims to discuss interactive features between solid Earth and climate evolution, for instance, atmospheric excitation of free oscillation in the solid terrestrial planets, crustal deformation and its influence on deep mantle rheological structure caused by post-glacial rebound, long-term climate evolution with volcanic degassing history, influence of topographic variations due to plate tectonics to the atmospheric circulations and physical and chemical interaction between ocean floor dynamics and oceanography. Other topics associated with an interaction between solid planetary geosciences and climate sciences should be addressed in this session. Contributions from all disciplines composed of Earth and Planetary Sciences (observations, field works, experiments and numerical computations) are definitely welcome.

[SCG55-P01]Sea level change due to Marinoan snowball deglaciation

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The Marinoan snowball Earth, which ended at ~635 Ma, offers us a set of sedimentary and geochemical records for studying a relative sea level (RSL) history of Earth system response to a large perturbation and its accompanied changes in the atmosphere and biosphere. An accurate perdition of post-Marinoan RSL changes would set independent constraints on the rate of recovery of the Earth system from a snowball state. Here we examine RSL changes due to glacial isostatic adjustment (GIA) associated with Marinoan snowball deglaciation by chiefly considering two RSL change patterns, (i) an RSL drop followed by RSL rise in the syn-deglacial phase (melting phase) inferred from the cap dolostones deposited on the continental slope in Namibia, and (ii) an RSL drop followed by RSL rise in the post-deglacial phase (time after the complete melting) inferred from the cap dolostones deposited on the continental shelf in South China, West Africa and Canada. We show that the physical mechanisms responsible for (i) and (ii) mainly depend on the coastline geometry, the syn-deglacial duration and mantle viscosity structure. Our modeling suggests that the RSL change patterns (i) and (ii) are explained by adopting the coastline geometry like a peninsula, a syn-deglacial duration of 10–20 kyr and a viscosity of ~10^{23} Pa s in the deep mantle. The deep mantle viscosity of ~10^{23} Pa is roughly equal to that inferred from the recent analyses using GIA data sets due to the last deglaciation.