Glacial history of Sør Rondane Mountains in Dronning Maud Land, East Antarctica introduced by geomorphology and surface exposure ages

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Antarctic ice sheet volume and sea ice extent are driven by Earth's global climatic system and more regional parameters such as albedo, thermohaline circulation, productivity of marine organisms, and erosion or weathering rate of base rock. A reconstruction of Antarctic ice sheet variability is essential to begin to understand their interactions. Previous studies have estimated a significant decrease in ice sheet thickness during the last several million years (e.g., Liu et al, 2010). However, the geographical extent of this decrease and its response and feedback to the global climate remain uncertain and topic of debate.

In this study, we focus on the past change of the ice sheet thickness at Sør Rondane Mountains in Dronning Maud Land, East Antarctica, because little is known about this region's deglaciation history. In 2010, we carried out a field expedition to investigate the past change of the ice sheet elevation based on detailed geomorphologic evidence and precise surface exposure ages using the cosmogenic isotopes Be-10. In total, 34 bedrock or erratic samples were collected from ca 1000 – 2500 m a.s.l. at the western and central part of Sør Rondane Mountains. Based on these data, we attempt to reconstruct key changes in glaciation of the Sør Rondane Mountains and we will discuss this in a wider context: connections between East Antarctic ice sheet changes and global climate. The exposure ages indicate a ca. 700 m decrease of the ice sheet surface elevation in the Sør Rondane Mountains through the Pleistocene time.

Reference

Liu, X., Huang, F., Kong, P., Fang, A., Li, X., and Ju, Y., History of ice sheet elevation in East Antarctica: Paleoclimatic implications, Earth and Planetary Science Letters, 290, 281–288, 2010.