



Evaluation of CMIP5 precipitation in Antarctica using Earth's oblateness observations

Byeong-Hoon Kim and Ki-Weon Seo

Seoul National University, Korea, Republic Of (ginew@snu.ac.kr)

Precipitation change in Antarctic Ice Sheet (AIS) plays an important role in global sea level rise. Most of the global climate models in the historical period (before 2005) commonly simulate an increase of precipitation in AIS on the decadal time scales due to the warming trend of global temperature change. However, ERA-Interim reanalysis depicts a decreasing trend in AIS precipitation during the same period. The decrease (increase) of precipitation causes ice mass loss (gain) acceleration, and the mass change can alter Earth's dynamic oblateness, J_2 , which has been accurately observed by multiple Satellite Laser Ranging (SLR) satellites since 1976. In this study, we estimate J_2 from all possible geophysical models including AIS precipitation and compare the estimated J_2 with observed J_2 . From the J_2 comparison, we conclude that the AIS precipitation decreased from 1979 to 2002 as depicted by ERA-Interim precipitation field. This result suggests that current global climate models may falsely simulate Antarctic precipitation variability, and thus possibly overestimates future precipitation increase in AIS and subsequently underestimate global sea level rise.