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ABSTRACT FINAL ID: G43B-0761;

TITLE: Global and arctic mean sea level variations observed by GRACE with the optimum ocean kernel

SESSION TYPE: Poster

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ABSTRACT BODY: Understanding the causes of global mean sea level (MSL) variations is an emerging issue due to its link to climate change and socioeconomic impact. Recently, satellite altimetry and gravimetry observations have been used to understand the two different causes of MSL variations, which are due to mass (eustatic) and density (steric) changes. In particular, GRACE launched in 2002 has been recognized as a pivotal observation for MSL study because it directly measures ocean mass variations. To design ocean averaging kernels for GRACE MSL study is important because the terrestrial leakage error underestimates MSL variations and need to suppress the error via ocean averaging kernels. In this study, we develop an optimum ocean kernel based on terrestrial leakage and ocean signals from synthetic GRACE data that includes terrestrial water storage, ocean bottom pressure and glacier melting. In addition, the alias error is generated through GRACE along track observations. The optimum filter estimates seasonal and secular MSL variations better than other ocean kernels that have been examined previously. We apply the new optimum ocean kernel for the real GRACE data and compare results with altimeter based estimates. The trend and annual amplitude of global MSL variations are 2.37 mm/yr and 8.63 mm, respectively, from JPL solutions that provides the least difference compared to the altimeter based MSL. Finally, arctic MSL variations and the possible error are evaluated. The error in the arctic ocean is larger particularly from the ocean tide alias, and thus we conclude further study is necessary to appraise the arctic MSL variations with current GRACE data.

INDEX TERMS: [1225] GEODESY AND GRAVITY / Global change from geodesy.

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