

GPS Evidence for Present-Day Dextral Shear Between East and West Antarctica and Postglacial Rebound in Marie Byrd Land

Andrea Donnellan, Jet Propulsion Laboratory and Bruce Luyendyk

GPS measurements collected between November 1998 and January 2002 in Marie Byrd Land, West Antarctica indicate 9.5 ± 1.5 mm/yr of dextral shear between East and West Antarctica and postglacial rebound of up to 12.6 ± 4.1 mm/yr in western Marie Byrd Land. Our GPS results indicate little spreading across the embayment between McMurdo station and WMBL. Our rate estimate between West Antarctica (including MCM4) ranges from -0.5 ± 1.2 mm/yr to 0.8 ± 1.3 mm/yr or near zero. Continued measurements are required to determine if a small amount of extension is still occurring. The results suggest faster spreading rates between the Pacific and Antarctic plates than between the Australian and Antarctic plates. The results of no spreading between East and West Antarctica, is consistent with observations of recent dextral shear overprinting earlier Mesozoic extensional events. The uplift rates are consistent with postglacial rebound models in which the ice sheet thins between 4000 and 2000 years B.P. Absolute position repeatabilities for the network are about 7 mm for the horizontal, and 15 mm for radius.