

Use of data from gravity satellites in better determining the characteristics and dynamics of high-latitude oceanographic circulation.

High latitude ocean circulation is known to be a key component in the Earth's climate system. These regions are, however, plagued by a paucity of data due to their remoteness and inhospitable natures. Remote sensing by satellites offers a powerful alternative to in situ studies: satellite altimetry, for example, is now a well-established tool for determining variability in surface ocean circulation. However, it suffers from the constraint that it adds no information on the time-mean circulation, due to the inaccurately-known marine geoid. (Similarly, in situ measurements of ocean fluxes from sea level recorders or bottom pressure recorders are also restricted to providing information on variability in flow). Data from satellite gravity missions such as GRACE (now flying) will provide information on the time-varying marine geoid; since this is essentially the changing weight of ocean and atmosphere above the seabed, this will constitute the first satellite-derived information concerning subsurface ocean properties. Studies that analyze satellite gravity measurements alongside altimeter measurements and in situ measurements of sea level/bottom pressure are needed so that this powerful new tool can be fully exploited in high latitude regions.

Mike Meredith (POL)