

The ocean flows downhill near the seafloor and recirculates uphill above

Donnerstag, 11. April 2024 10:30 (20 Minuten)

The oceans circulation redistributes heat, salt, biota, dissolved gases, microplastics, and sediments on Earth. The interior ocean, 100 - 1000 m above the sloping seafloor, moves on average mainly with the deeper seafloor to its left in the Northern Hemisphere and to its right in the Southern Hemisphere. It has not been addressed how bottom friction and the steepness of the seafloor affect this widespread interior flow and what the consequences are for the vertical circulation. Here we show, using current meter measurements and numerical simulations, that the interior flow is deflected by bottom friction into a widespread near-bottom downhill flow, which is stronger the steeper the seafloor. Typical local changes in seafloor steepness lead to a shallow divergence and a deep convergence of this downhill flow that are connected by an overlaying uphill re-circulation to closed overturning cells that reach far up into the water column. As oceanic overturning is climate-relevant, our study highlights the need to better understand the associated dynamics, to identify its climate and Earth system impacts, and to implement these impacts into climate and Earth system simulations. Furthermore, the effects of widespread near-bottom downwelling on sediments, microplastics, and biota need to be investigated in the future. (The abstract is taken from this preprint: www.researchsquare.com/article/rs-3872319/v1)

Hauptautor: SCHUBERT, René (UBO, CNRS, IRD, Ifremer, LOPS, IUEM, Plouzané, France)

Co-Autoren: Prof. GULA, Jonathan (UBO, CNRS, IRD, Ifremer, LOPS, IUEM, Plouzané, France); Dr. CAPO, Esther (UCLA, Los Angeles, USA); Dr. DAMIEN, Pierre (UCLA, Los Angeles, USA); Dr. MOLEMAKER, Maarten (UCLA, Los Angeles, USA); Dr. VIC, Clément (UBO, CNRS, IRD, Ifremer, LOPS, IUEM, Plouzané, France); Prof. MCWILLIAMS, James (UCLA, Los Angeles, USA)

Vortragende(r): SCHUBERT, René (UBO, CNRS, IRD, Ifremer, LOPS, IUEM, Plouzané, France)

Sitzung Einordnung: Conference