

Seminar “Ocean, Ice and Atmosphere”,  
Institute of Environmental Physics (IUP), Univ. Bremen  
Date: 12-Nov-2024, 12:15  
Place: Building NW1, Room S1360

## Leads and Sea Ice Ridges in the Arctic in a Warming World

**Jan Philipp Gärtner (AWI)**

Email: [jan.gaertner@awi.de](mailto:jan.gaertner@awi.de)

The Arctic sea ice cover is characterized by narrow bands of intensified deformation, forming leads and sea ice ridges, together referred to as Linear Kinematic Features (LKFs). These LKFs are important features of the Arctic system as they enhance heat and momentum exchange between the ocean and atmosphere, shaping not only the evolution of sea ice but also regional ocean dynamics and climate. Climate change, in turn, influences LKF formation as the sea ice cover will be affected by changes in atmospheric and ocean temperature. Moreover, the distribution and frequency of LKFs hold significant implications for Arctic shipping routes. This study examines the response of Arctic LKFs to future warming using sea ice data from a climate simulation spanning from 1985 to 2100, based on the coupled ocean-sea ice model FESOM2. The atmospheric forcing follows the SSP585 scenario which predicts an increase in global mean surface temperature of 4 °C by the end of the century. Results indicate an increase in LKF frequency in a warmer climate, with wintertime LKF activity in future climates resembling current summertime conditions. Increased LKF formation is found in coastal regions and above topographic features such as the Lomonosov Ridge and the continental shelf break.