The trillion ton iceberg which recently broke off from the Larsen C ice shelf in Antarctica has got the world talking about the imminent risk it poses. Understanding the mass balance and evolution of Antarctic ice shelves is crucial for a better understanding of the Antarctic contributions to the global sea-level changes. The coastal ice shelves and ice rises are inter-connected systems and provide a buttressing effect to Antarctic ice sheet stability and needs to be investigated. Ice rises are also useful sites to investigate the proxy records of Antarctic climate and their linkages with the global change. To undertake a detailed study of ice shelves and ice rises of coastal Dronning Maud Land (DML), an Indo-Norwegian project named MADICE (Mass balance, dynamics, and climate of the central Dronning Maud Land coast, East Antarctica) was initiated in 2016. The project involves active collaboration between the scientists from National Centre for Antarctic and Ocean Research and the Norwegian Polar Institute. The MADICE project investigates the ice dynamics, current and past changes in atmospheric and sea ice dynamics of the central DML coast using remote sensing data, geophysical field measurements, and ice core based climate reconstruction.

As part of the MADICE project, major field campaigns are undertaken on the dynamics and climate records of coastal ice rises along the central DML coast of Antarctica. During the 2016-17 field campaign, the glaciology team conducted a range of glaciological and geophysical surveys to examine ice shelf dynamics and ice rise evolution in the past. The campaign made detailed kinematic GPS surveys over the two ice rises to precisely measure surface elevations. Deep-and shallow-sounding ice-penetrating radar were deployed to map the bed topography and ice stratigraphy. Autonomous phase-sensitive radar (ApRES) surveys were also made and reoccupation of some these sites in future will provide evidence of ice-thickness changes and/or basal melting rates of ice shelf. Two ice core drillings (122 and 51 m, respectively) were made at the summits of Djupranen and Leningradkollen ice rises. Proxy data from these cores would enable us to examine the past climate records and their link to the ice dynamics and oceanic processes.

The second field campaign related to MADICE will be undertaken during 2017-18 Antarctic season.