

**Abstract 26 – Paper ID: 096****Investigation of Morphological Changes over Larsen C Ice Shelf Using MODIS Data**

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**Abstract**

Ice shelves are extended cantilever part of ice sheets, attached with ground and floats on ocean, act as sensitive indicators of climate change. More than 40% of Antarctic coast is fringed with it. Larsen ice shelf (LIS) is a long fringing ice shelf in the northwest part of the Weddell Sea, extending along the east coast of the Antarctic Peninsula which consists of four ice shelves as Larsen A, B, C and D. Catastrophic collapse of Larsen A and B during the years 1995 and 2000 respectively, turned attention of researcher to this area and thereafter, monitoring of the changes happening over the remaining part of LIS was started. In the present study, we have investigated decadal (2003–2014) morphological changes occurring over seven different locations on Larsen C ice shelf using five MODIS (Moderate Resolution Imaging Spectro-radiometer) channel 2 (near-infrared) (250 m resolution) cloud clear images of summer period. Average advancement of  $\sim 0.82$  km/yr has been measured over two locations with reference to the boundary of the year 2000 generated using RAMP (Radarsat Antarctic Mapping Mission). In the year 2005 the iceberg of area  $\sim 1625.50$  km<sup>2</sup> was calved from the ice shelf. The high pass filter with a kernel of  $5 \times 5$  pixels is used to map the rifts and crevasses present over the shelf. The maximum percentage of rift area and maximum crevasses area were found to be  $\sim 8\%$  and  $\sim 24\%$  respectively, in the year 2006. Rate of rift widening was measured to be  $\sim 0.14$  km/yr. Along with these we have used MOD09 reflectance (500 m resolution) products of MODIS to investigate a feature on shelf showing different reflectance relative to nearby place on shelf. We have plotted a reflectance curve for all five images over a specific feature which showed a similar pattern resembling a typical snow reflectance curve. NDSI (Normalized Difference Snow Index) values calculated over the same region for all five years are greater than 0.4, which implies region is covered with snow.

**Keywords:** Larsen C Ice Shelf, MODIS, Morphological changes, Ice shelf dynamics, Rift and crevasse mapping, Antarctic cryosphere