# Sea ice leads and melt ponds from MISR using Super-Resolution Restoration

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During the Arctic summer, an increasing portion of the Arctic sea ice area contains leads and melt ponds. These features absorb more heat, which reults in more sea ice melting. Effective monitoring and modelling of these sea ice leads and melt ponds are essential to calculate the radiative budget of the coupled ocean, ice, and atmosphere system. In this work, we demonstrate the potential of using the UCL MAGiGAN super-resolution restoration (SRR) system based on multi-angle feature restoration and deep learning networks to produce up to a factor of 3.75 times resolution enhancement of the Multi-angle Imaging SpectroRadiometer (MISR) images [1] to better support sea ice leads and melt pond studies. We demonstrate that the UCL MAGiGAN SRR system not only retrieves subpixel information from multi-angle views, but also uses the losses calculated from feature maps of a deep learning network to retrieve high texture detail. In this work, examples of SRR results for a sea ice field with MISR images taken on the 7th June 2007 will be shown along with an analysis and comparison with ASTER data on 4th July 2018. The potential of using the UCL MAGiGAN SRR system for machine learning-based sea ice leads and melt ponds study will be discussed along with a preliminary assessment of the resolution increase and classification accuracy.

[1] Tao, Y. and Muller, J.P., 2019. Super-Resolution Restoration of MISR Images Using the UCL MAGi-GAN System. Remote Sensing, 11(1), p.52. doi:10.3390/rs11010052