

IAF EARTH OBSERVATION SYMPOSIUM (B1)  
Mitigating the Climate Crisis from Space (6)

Author: Mr. Björn Lütjens  
Massachusetts Institute of Technology (MIT), United States, lutjens@mit.edu

SATELLITE IMAGERY OF THE FUTURE: VISUALIZING ARCTIC SEA ICE MELT WITH  
PHYSICALLY-CONSISTENT GENERATIVE ADVERSARIAL NETWORKS**Abstract**

Visualizations of climate change are used to communicate climate impacts in an intuitive, engaging, and relatable manner. Timelapses of satellite imagery, for example, are often used to illustrate the pace of Arctic sea ice or glacial melt, but only exist for past events. Recently, a novel technique from deep learning called generative adversarial networks has been used to generate photorealistic and physically-consistent visualizations of future coastal floods, as seen from space. We extended the deep learning system to create satellite imagery of the future Arctic; visualizing Arctic sea ice and glacial melt. To ensure only trustworthy imagery is generated, we evaluated all visualizations against physics-based predictions from climate models. We have trained and tested our model, based on pix2pixHD, on over 25 thousand tiles of satellite imagery. The shown work is part of the MIT Earth Intelligence Engine, which is creating an interactive tool for exploring the effect of climate policies via visualizations of the corresponding local climate impacts.