An Evergreen Forest Ecosystem from Satellites: CISESS Scientist Qingyuan Zhang has a new article to be published in the December issue of the *International Journal of Applied Earth Observation and Geoinformation* that characterizes the seasonally snow-covered Howland boreal forest ecosystem in Maine, USA with satellite images. Vegetation cover fraction (VGCF), canopy chlorophyll content (µg/cm²), and fractional absorption of photosynthetically active radiation (fAPAR) by all canopy components, by canopy chlorophyll, and by canopy non-chlorophyll components, snow cover fraction, soil cover fraction, and other information were extracted from optical satellite images in 2001 – 2014 (see Figure). Snow was seen during December to April. Seasonal VGCF and fAPAR_canopy showed a summer plateau (VGCF: 0.97 ± 0.01; fAPAR_canopy: 0.90 ± 0.01). Both seasonal fAPAR_{chl} and fAPAR_{non-chl} changed with time, and seasonal fAPAR_{non-chl} had a bimodal shape. Spring VGCF varied between 0.54 and 0.69 (0.61 ± 0.04). Spring fAPAR_{chl} and fAPAR_{non-chl} were 0.22 ± 0.03 and 0.21 ± 0.02, respectively. Peak summer fAPAR_{chl} was 0.58 ± 0.02. The lowest summer fAPAR_{non-chl} was 0.32 ± 0.02. Replacing fAPAR_canopy with fAPAR_{chl} to simulate boreal forest ecosystem gross primary production can reduce uncertainties in simulations. Higher spring temperature increases boreal forest fAPAR_{chl}.
Figure. The 6 × 6 km² Howland forest area in Maine: (A) the true color image obtained by the EO-1 Hyperion on March 5, 2014 (DOY 64) at a spatial resolution of 30 m; and maps of (B) snow cover fraction (SNOWCF); (C) surface water cover fraction (WaterBodyCF); (D) soil cover fraction (SOILCF); (E) vegetation cover fraction (VGCF); (F) fAPAR\textsubscript{canopy}; (G) fAPAR\textsubscript{chl}; (H) fAPAR\textsubscript{non-chl}.


(POC: Qingyuan Zhang, qyzhang@umd.edu, Funding: JSTAR (CISESS) and Disaster Supplemental)

Media and Outreach

2021 Mid-Atlantic ChaserCon: CISESS lightning team scientists Joseph Patton and Daile Zhang attended the 2021 Mid-Atlantic ChaserCon, held at the Science Museum of Virginia in Richmond, VA on November 6th. The conference aims to provide a forum for meteorologists at National Weather Service, broadcast meteorologists, emergency managers, storm chasers and other professional and amateur meteorologists across the great Mid-Atlantic area to network and discuss local severe storms and promote ideas to raise public awareness of severe weather and emergency management. The lightning team informed meteorologists of the use and value of the NOAA’s Geostationary Lightning Mapper (GLM) gridded products. The meteorologists spoke highly of the operational GLM data as an instrument that continuously observes lightning activity, tracks thunderstorms, and improved severe weather forecasting and nowcasting. Their positive feedback is also helpful for the lightning team to better serve the community.
(POC: Daile Zhang, dlzhang@umd.edu, Funding: GOES-R AWG, GOES-R PGRR, NOAA-NASA ROSES)

Other

CISESS Consortium Member University of California at Irvine: This year, we have our first CISESS project with consortium member University of California at Irvine. Funded by the National Oceanographic Partnership Program (NOPP), Professor Adam Martiny will be partnering with NOAA researchers, including STAR’s Paul DiGiacomo, to quantify the global biodiversity of pelagic plankton. This will be part of the GO-SHIP survey, a ship-based global survey of ocean hydrographic sections. For more on this project, see https://nopp.org/projects/piloting-bio-go-ship-on-us-cruises-towards-a-global-analysis-of-large-scale-changes-to-ocean-plankton-systems/.
Martiny has a new article on plankton responses to climate change in press at the journal *Limnology and Oceanography*. This article is about model studies of three different climate scenarios and their impact on three picophytoplankton lineages. All groups increased in abundance at low latitude and showed bands of decreases and increases in mid- and high-latitudes. The uncertainties for these findings were significant and were found to depend primarily on biological and environmental parameters rather than anthropogenic uncertainty. Flombaum, Pedro and **Martiny, Adam C.**, 2021: Diverse but uncertain responses of picophytoplankton lineages to future climate change. *Limnol. Oceanogr.*, in press, [https://doi.org/10.1002/lno.11951](https://doi.org/10.1002/lno.11951). (POC: Adam Martiny, amartiny@uci.edu, Funding: NOPP)