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Enhancing NESDIS Global Automated Snow and Ice Cover Mapping System

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A new version of the Global Multisensor Automated Snow and Ice Mapping System (GMASI) has been implemented into operations at NESDIS is summer 2023. The new system is an upgrade of the previous version of the GMASI which was operated since 2006. The system provides information on the snow and ice distribution for NOAA numerical weather prediction and climate models as well as for a number of other atmosphere and land remote sensing products. The retrieval algorithm uses satellite observations in the visible/infrared and in the microwave spectral bands and delivers daily spatially continuous (gap-free) maps of the snow and ice cover.

Compared to previous version, the new system incorporates data from a larger set of microwave sensors and features an enhanced retrieval algorithm. The spatial resolution of the output maps has been improved from es improved from 4km to 2km. In the presentation we provide details of the data processing algorithm and of the output product focusing on the improvements and upgrades. We demonstrate that the output of the new GMASI system closely matches the accuracy of snow maps produced within NOAA Interactive Multisensor Snow and Ice Mapping System (IMS) and agrees well to in situ station snow depth report. Improvements to the retrieval algorithm mostly affected reproduction of small-scale features in the snow and ice cover distribution, particularly in alpine areas. In the same time, large-scale climatologically-important cryosphere features as the continental and hemisphere snow and ice extent estimated with the new snow and ice maps remain consistent with the previous version of the product.