

Land Surface Temperature and Infrared Emissivity at High Latitudes from Advanced Infrared Sounder Observations

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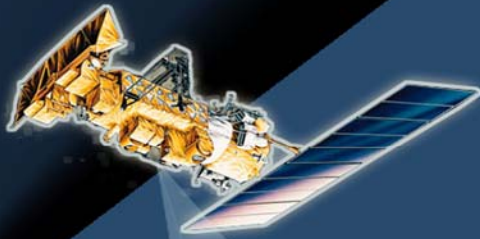
In preparation for the routine NWP assimilation of operational advanced infrared sounder data (IASI on MetOp and CrIS on NPOESS) over high latitude land regions of the globe, we present a methodology to determine land surface temperature from clear fields of view. The method is demonstrated using NASA AIRS and MODIS data over snow covered land and sea ice. MODIS data collocated within AIRS fields of view are used to estimate the uniformity of the scene. Also the derived surface emissivity derived from AIRS is compared to theoretical expectations of snow emissivity by Dozier. A clear filter is applied to the AIRS data which uses both the MODIS sub-pixel uniformity and consistency with the expected snow emissivity within certain limits. A surface temperature is derived from these clear AIRS pixels using one or more estimation methods. Preliminary validation is provided from ground truth measurements from the U.S. Atmospheric Radiation Measurement North Slope of Alaska (ARM NSA) site and selected surface radiation sites in other locations. A time series is also provided of derived surface temperatures for the Greenland ice sheet to illustrate the time continuity and sampling of these high latitude observations from polar orbiting satellites.

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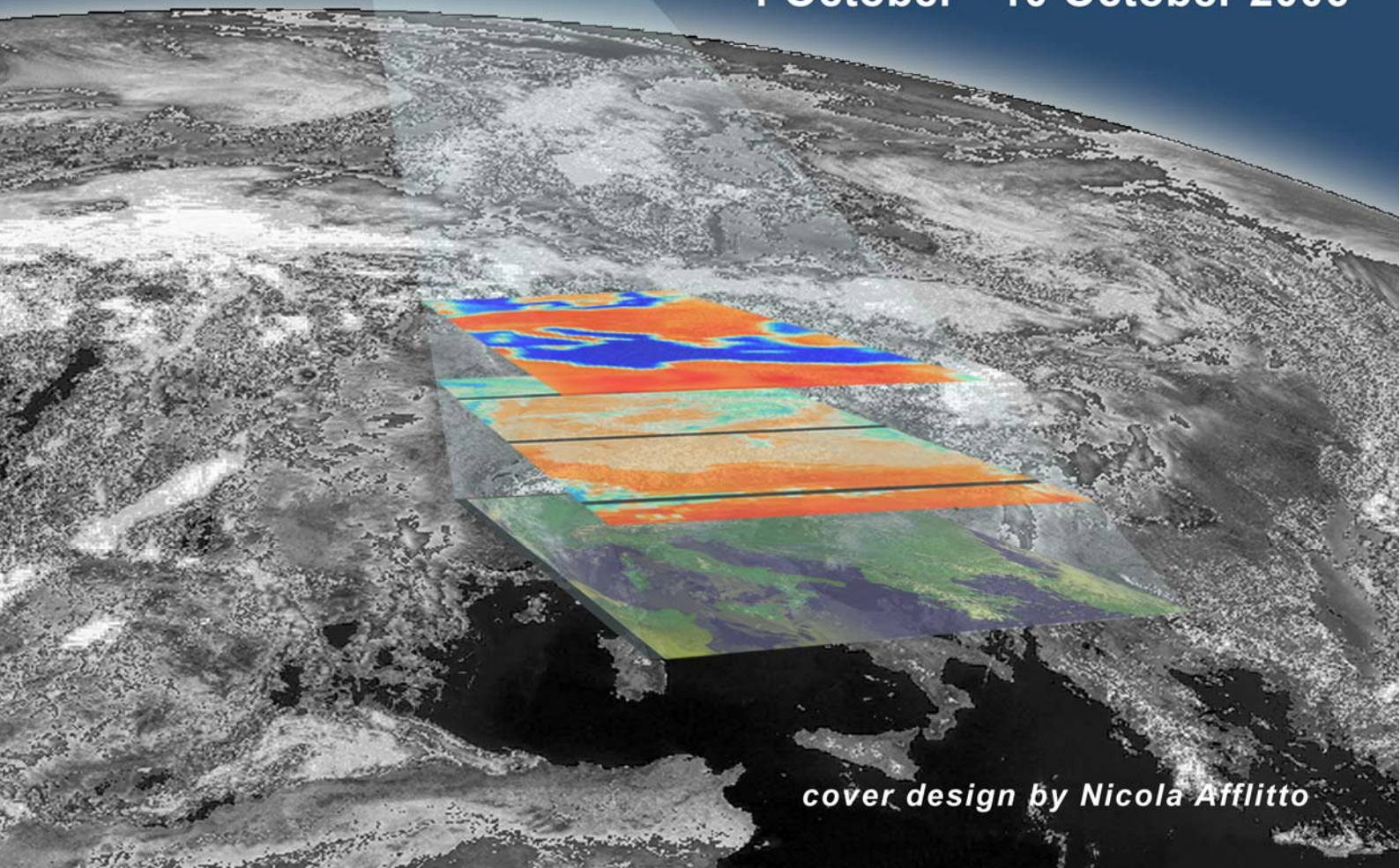
using space-based observations



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