



Atmospheric and surface retrievals in the infrared and shortwave using the HT-FRTC code

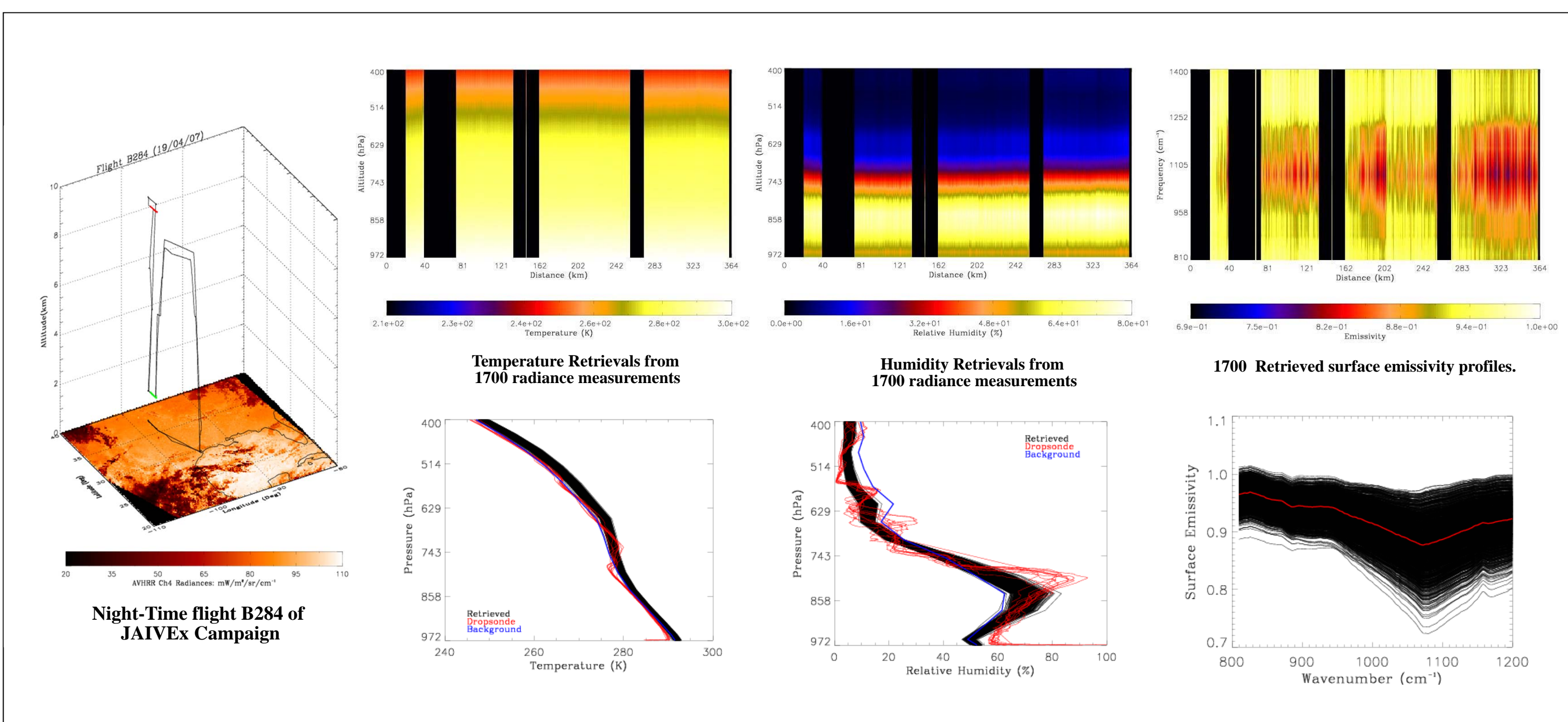
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We have developed a new algorithm for the simultaneous retrieval of the atmospheric profiles (temperature, humidity, ozone and aerosols, clouds) and the surface reflectance/emissivity from infrared and shortwave hyperspectral radiances measured by air/space-borne, hyperspectral imagers such as ARIES, IASI, CrIs, Hyperion EO-1 or AVIRIS.

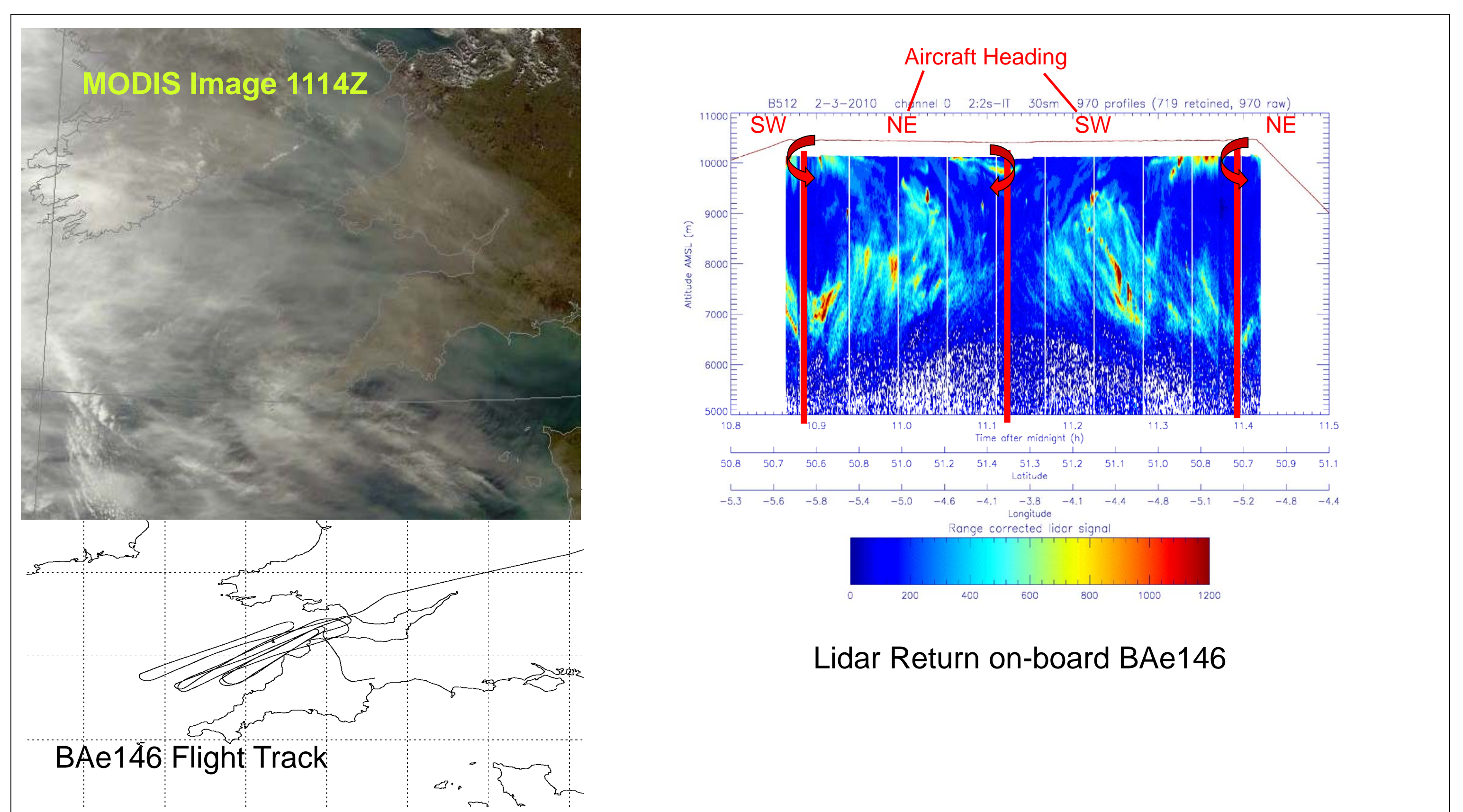
The new scheme, proposed here, consists of a fast radiative transfer code, the HT-FRTC code which is based on empirical orthogonal functions (EOFs), and a 1D-Var retrieval scheme. The inclusion of an 'exact' scattering code based on spherical harmonics, allows for an accurate treatment of Rayleigh scattering and scattering by aerosols, water droplets and ice-crystals, thus making it possible to retrieve cloud and aerosol optical properties. An important point to notice here is that the surface reflectance/emissivity profiles are retrieved in principal component space and not in physical space, thus enabling us to retrieve all the channels for a given instrument without difficulties.

Moreover, as the HT-FRTC code is sensor-independent only one training set is required for a given wavelength interval. For Example retrievals for ARIES, IASI, AIRS and CrIs can be done without needing to retrain the HT-FRTC code.

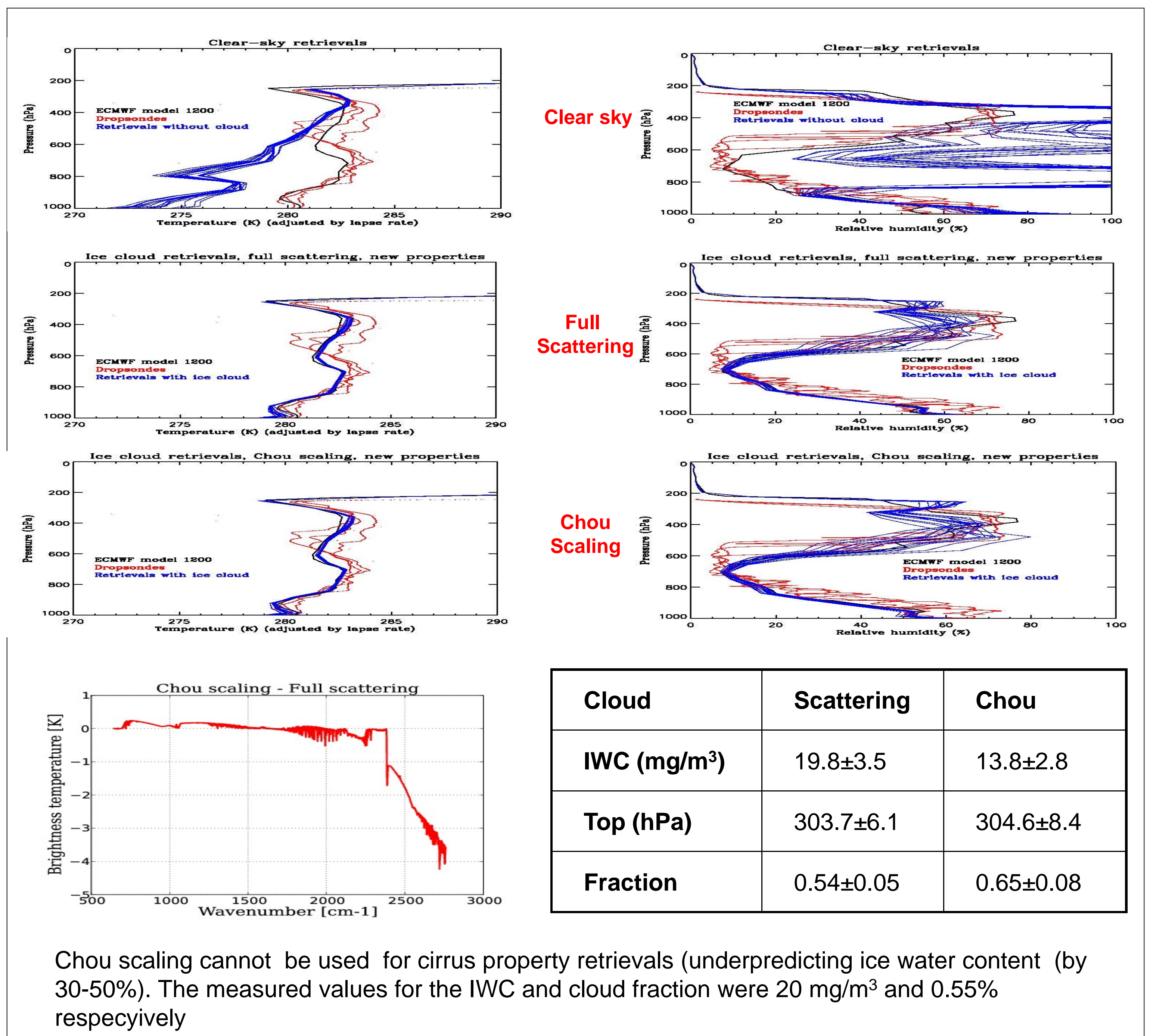
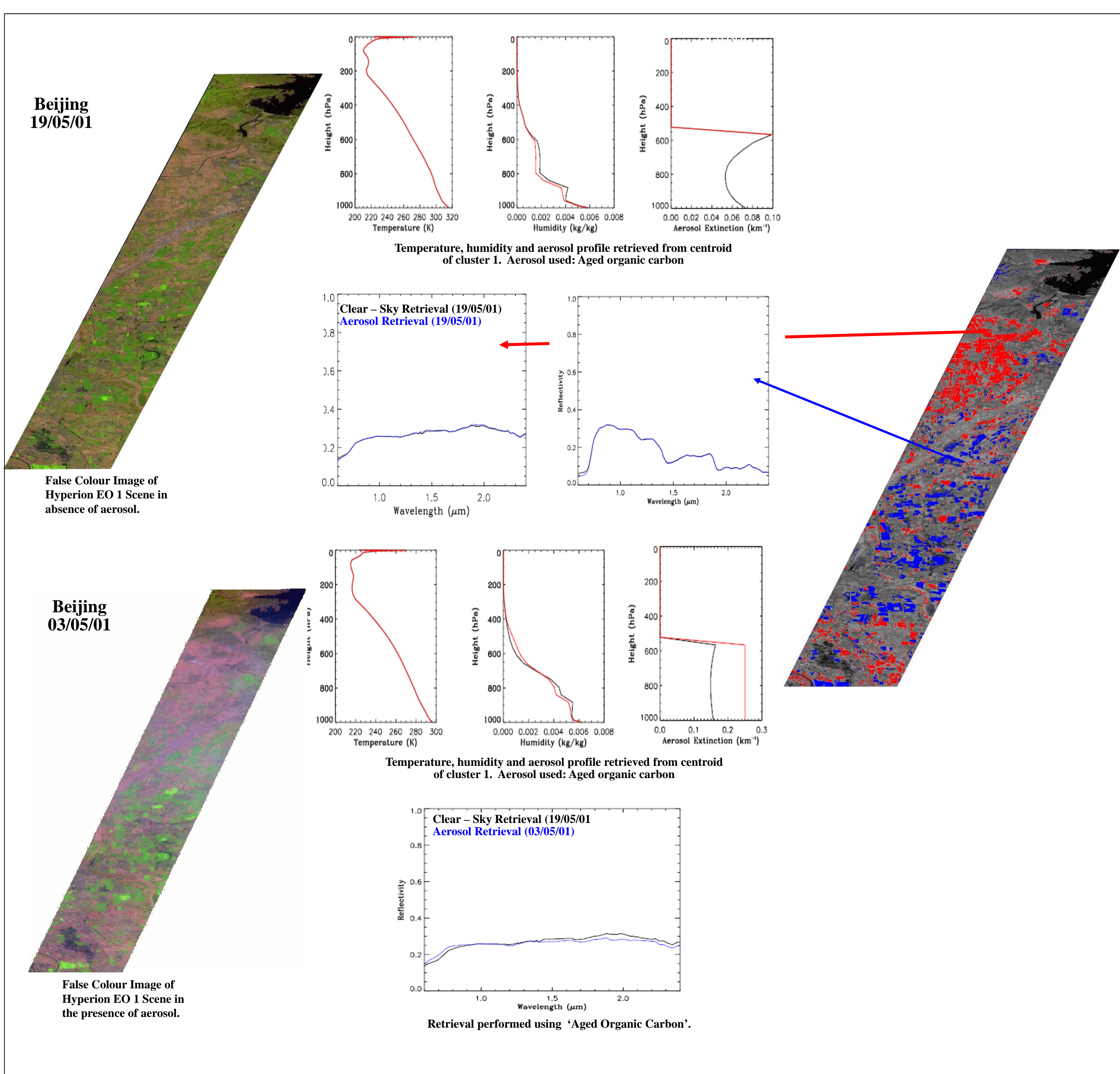
1. Surface Emissivity Retrievals over the Oklahoma ARM Site



3. IASI 1d-Var Cirrus Cloud Retrievals



2. Surface Reflectance Retrievals over Beijing



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