Skin temperature analysis used for the assimilation of clear-sky radiances

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Abstract

We recently proposed a new approach to the skin temperature analysis used for the assimilation of clear-sky radiances, as part of ECMWF atmospheric 4D-Var system. For that purpose, we added hourly skin temperature fields in the 4D-Var control vector. Some of these fields are associated with the infrared (IR) instruments and others with the microwave (MW) instruments. We will first present the impact of the new approach on the ECMWF Integrated Forecasting System forecast skill.

This new approach is the first stepping stone toward a seamless coupling between atmosphere and surface (land and ocean). We will show for example how the IR skin temperature fields could be used to derive a sea surface temperature that could be used to force the ocean model. We will also show that, with this approach, we change the surface emissivity used for the assimilation of MW radiances. This emissivity change could be used to provide information on the emissivity models.

Keywords: Radiances, skin temperature, emissivity, SST

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