

The Community Radiative Transfer Model (CRTM) Framework

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The mission of the Joint Center for Satellite Data Assimilation (JCSDA) is to accelerate and improve the quantitative use of satellite data in weather and climate prediction models. The Community Radiative Transfer Model (CRTM) is an important component of this by introducing additional capabilities – such as scattering by clouds and aerosols, and a more integrated treatment of surfaces – into the computation of satellite instrument radiances. As part of this process, external research groups funded by the JCSDA are making contributions to the CRTM development. In order to help developers to understand the requirements of the data assimilation system and to reduce the inconsistencies among the components developed by various groups, a software framework has been devised for the CRTM. The main goal of this CRTM framework is to provide developers with the information and utilities necessary to produce software that is flexible (in both development and usage), understandable, and easily maintained.

The CRTM framework breaks the radiative transfer model into components (e.g. gaseous absorption, scattering, surface optics); each of which defines its own data structure and algorithm modules to facilitate independent development of each component. This characterisation is obviously an ideal one since there are dependencies that do not allow every component to be developed in isolation from the others. As such, the CRTM framework is not intended to be a replacement for necessary dialogue between developers, but to provide some form of “big picture” for all those involved to minimise or eliminate potential software conflicts and redundancies.

Due to the complexity of the radiative transfer problem and the difficulty of balancing code efficiency and flexibility, we fully anticipate problems arising when the framework is applied in the development process. This poster is part of this process to present the framework to the community and to solicit feedback from interested parties for improvements to help realise the JCSDA goals of faster operational implementation, and increased usage, of satellite data in Numerical Weather Prediction models.

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