MODIS Cloud Microphysics Product (MOD_PR06OD) Data Collection 6 Updates

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Introduction

Our group has a significant number of science improvements planned for MODIS data collection 6. In this poster we introduce our proposed changes, show some of the available results for changes already implemented and discuss our overall progress.

Brief Summary of Planned Changes

– Improved multilayer cloud detection algorithm that includes two additional tests and stores values as a true confidence level.

– New forward libraries with expanded ranges of optical thickness and effective radius, based on DISORT with no asymptotic theory. These libraries have improved computationtal resolution that allow us to capture fine features of the phase functions better than before. Single scattering is now added on the fly during retrieval instead of being a part of library reflectance, thus reducing the complexity needed to capture the forward peak. The new library set also includes Cox-Munk ocean BRDF model and new ice crystal phase functions from UW-Madison. We also provide tables of g and ω_0 values for ice clouds as part of collection 6 MOD06 files so users can rescale our output as needed. Interpolation is now done using more reasonable limits based on scattering angle.

– A number of improvements to our handling of ancillary data, such as temporally interpolating model atmospheric profiles, new surface albedo libraries, high resolution cloud top properties data.

– Improvements to our cloud thermodynamic phase algorithm

– Improved clear sky restoral algorithm with color tests to better distinguish between dust and uniform cloud.

– Improved retrieval solution logic

– Improved retrieval quality settings based on our pixel-level retrieval uncertainty results

– Improvements to our 1.6µm and 3.7µm retrievals, such as decoupling of answers from 2.1µm results, iteration on correction for cloud emissivity, improved atmospheric emission correction and better surface temperature data.

Sample Results

Many of these planned changes have already been implemented. In this section we show granule test results of new forward libraries. This test does not include Cox-Munk BRDF or new ice crystal phase functions.

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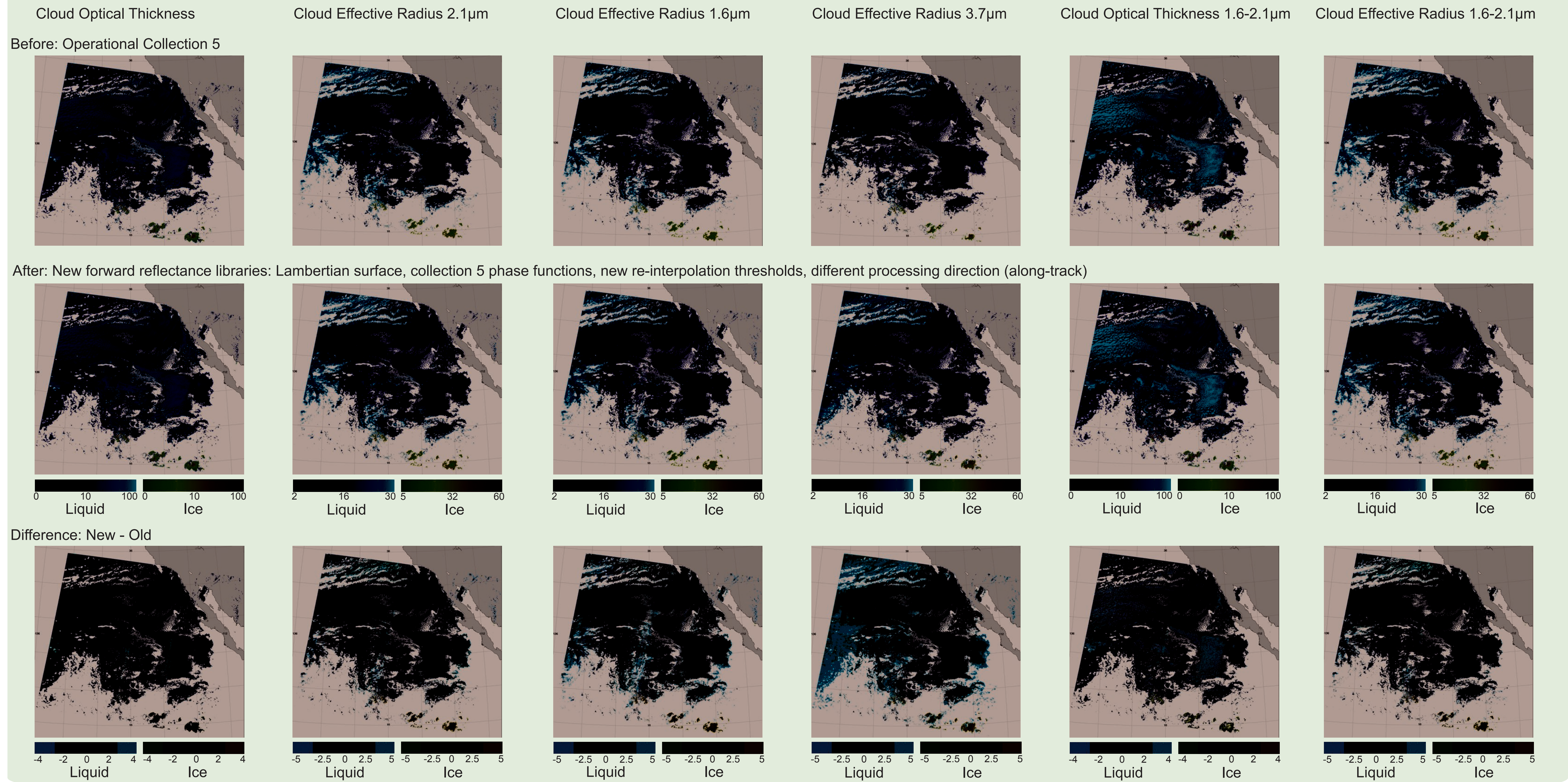
Science Tests and Future Developments

We are currently conducting a series of science tests to examine precise impact of each of our planned changes. We process data one month at a time and aggregate resulting Level-2 files all the way to monthly Level-3. We have very fine control over the test system, so we are able to study each individual change with everything else held constant. At this time we have planned 12 primary science tests, with re-test procedures included. We have completed two science tests already with the third one being prepared for execution. This test system implemented through MODAPS gives us unprecedented depth of analysis of our results.

Approximate Test Schedule