

# AERO-SAT

## Discussion Session on Long Term Satellite-Based Aerosol Time Series

*[www.aero-sat.org](http://www.aero-sat.org)*

- Product A.10.1 Aerosol optical depth**
- Product A.10.2 Aerosol single scattering albedo**
- Product A.10.3 Aerosol layer height**
- Product A.10.4 Aerosol extinction profiles from the troposphere to at least 35km**

## Benefits

- Improved aerosol products, thereby leading to a reduction in uncertainty as to the quantitative role of aerosols in climate forcing identified by the IPCC;
- Improved products that are needed to validate and improve the capability of climate simulation models and reanalyses to represent aerosol effects.

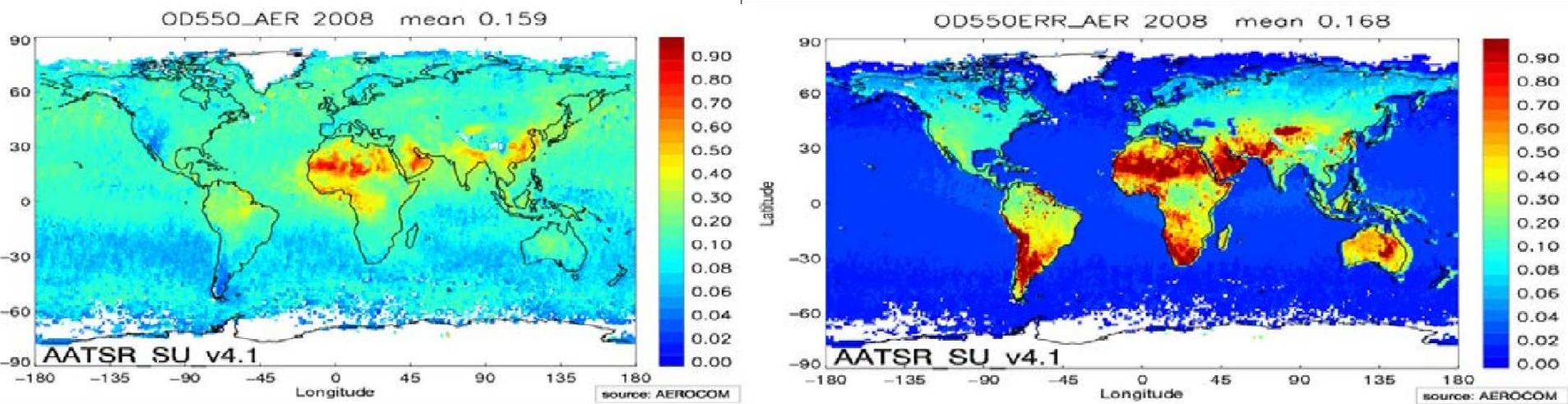
## Target Requirements

| Variable/ Parameter                    | Horizontal Resolution | Vertical Resolution                               | Temporal Resolution | Accuracy        | Stability |
|----------------------------------------|-----------------------|---------------------------------------------------|---------------------|-----------------|-----------|
| Aerosol optical depth                  | 5-10km                | N/A                                               | 4h                  | Max (0.03; 10%) | 0.01      |
| Single-scattering albedo               | 5-10km                | N/A                                               | 4h                  | 0.03            | 0.01      |
| Aerosol-layer height                   | 5-10km                | N/A                                               | 4h                  | 1km             | 0.5km     |
| Aerosol-extinction coefficient profile | 200-500km             | <1km near tropopause, ~2km in middle stratosphere | weekly              | 10%             | 20 %      |

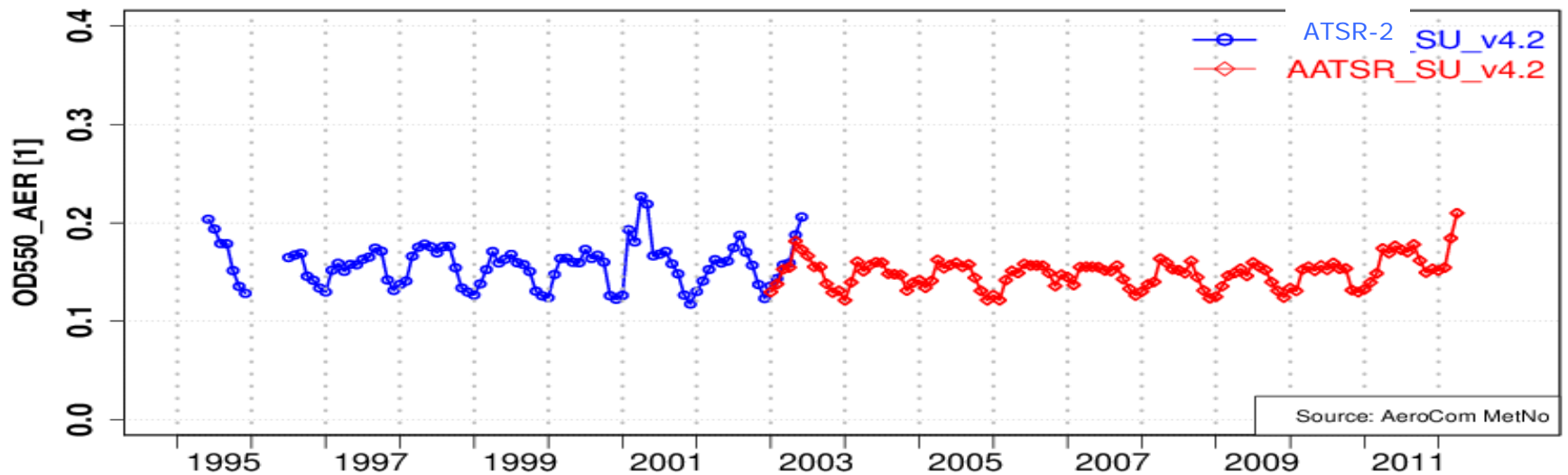
\*CDR = Climate Data Record

|                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Full description of all steps taken in the generation of FCDRs and ECV products, including algorithms used, specific FCDRs used, and characteristics and outcomes of validation activities |
| 2. Application of appropriate calibration/validation activities                                                                                                                               |
| 3. Statement of expected accuracy <sup>6</sup> , stability and resolution (time, space) of the product, including, where possible, a comparison with the GCOS requirements                    |
| 4. Assessment of long-term stability and homogeneity of the product                                                                                                                           |
| 5. Information on the scientific review process related to FCDR/product construction (including algorithm selection), FCDR/product quality and applications <sup>7</sup>                      |
| 6. Global coverage of FCDRs and products where possible                                                                                                                                       |
| 7. Version management of FCDRs and products, particularly in connection with improved algorithms and reprocessing                                                                             |
| 8. Arrangements for access to the FCDRs, products and all documentation                                                                                                                       |
| 9. Timeliness of data release to the user community to enable monitoring activities                                                                                                           |
| 10. Facility for user feedback                                                                                                                                                                |
| 11. Application of a quantitative maturity index if possible                                                                                                                                  |
| 12. Publication of a summary (a webpage or a peer-reviewed article) documenting point-by-point the extent to which this guideline has been followed                                           |

# Example CDR from ESA's aerosol\_cci

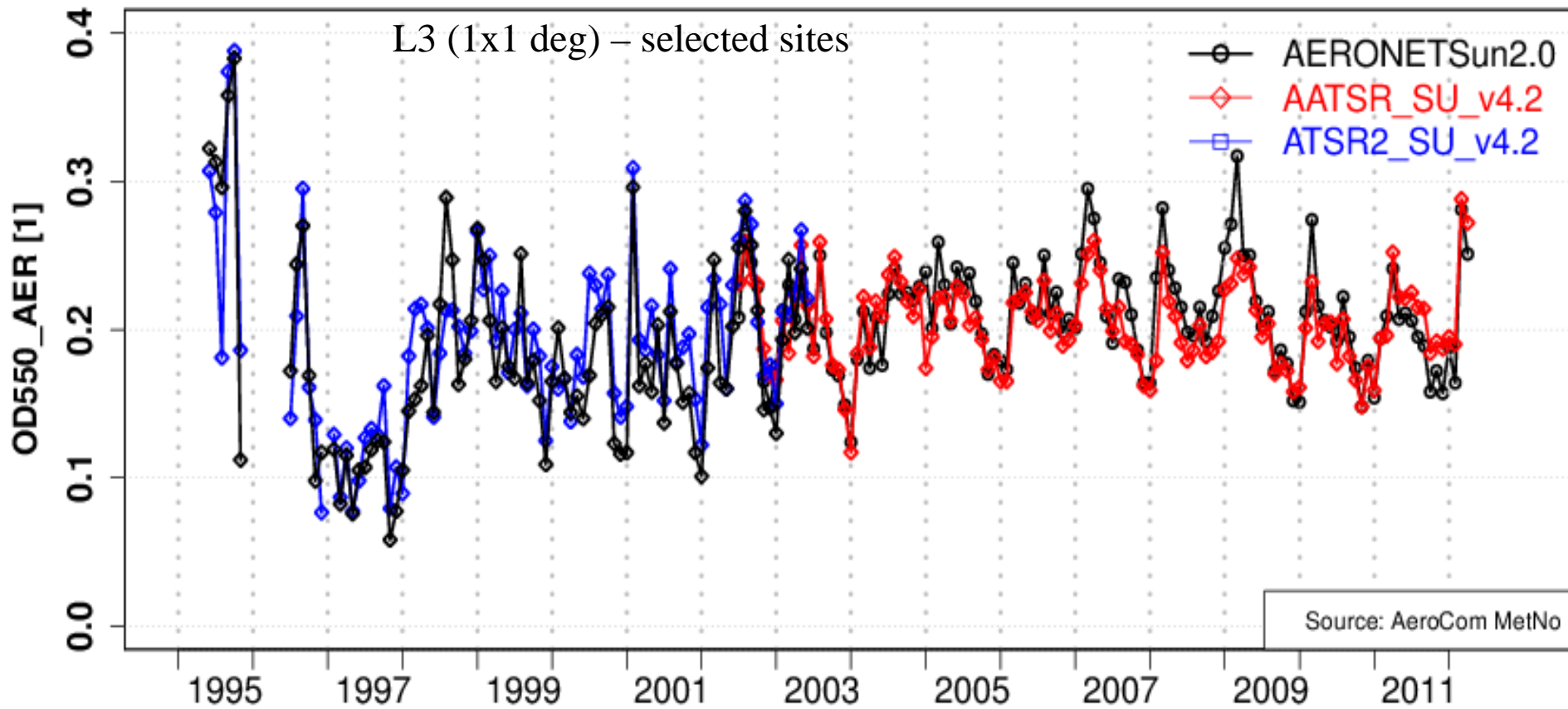


WORLD – Trend\_in\_Area\_Mean



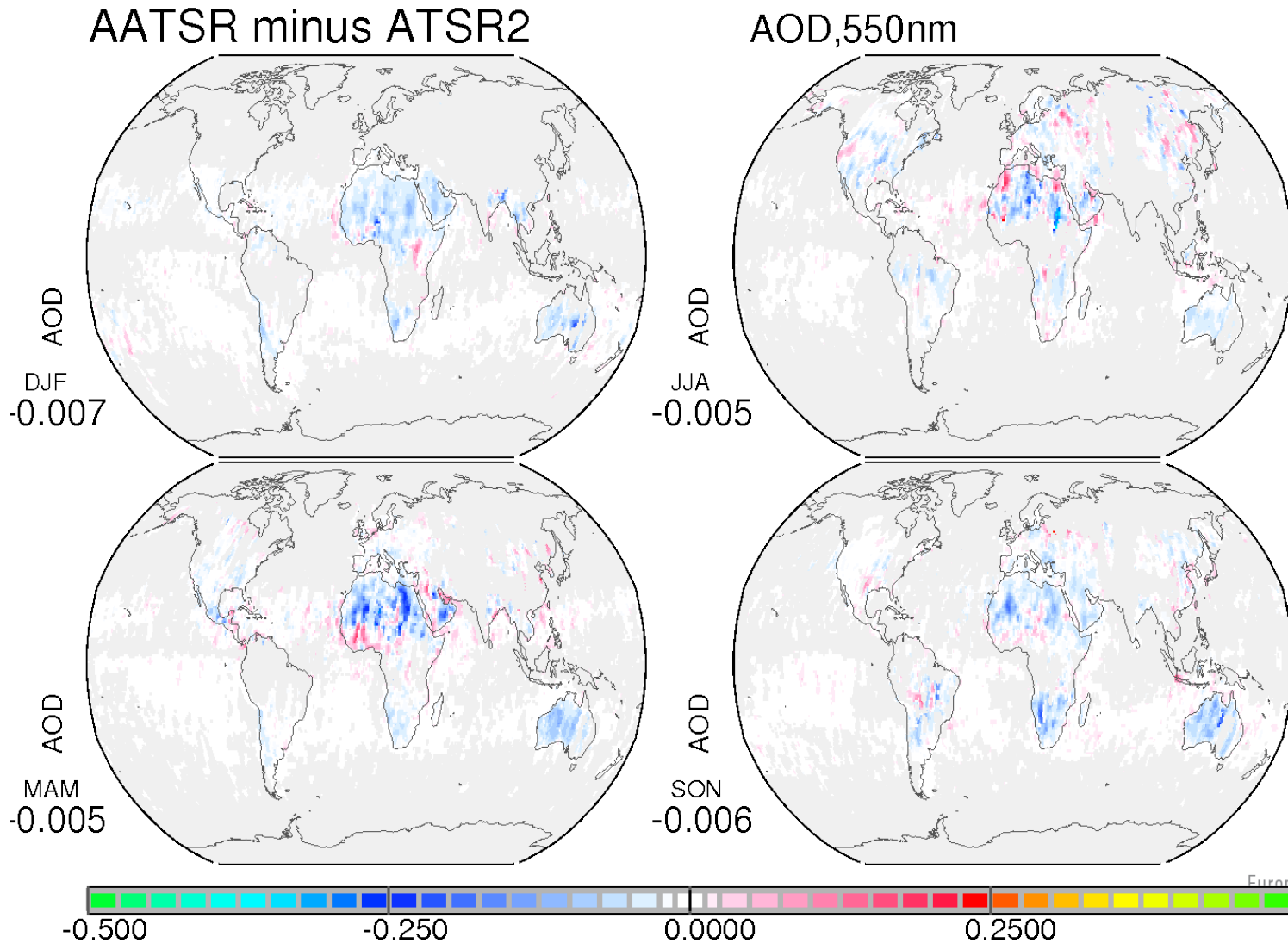
cy

# Example CDR from ESA's aerosol\_cci

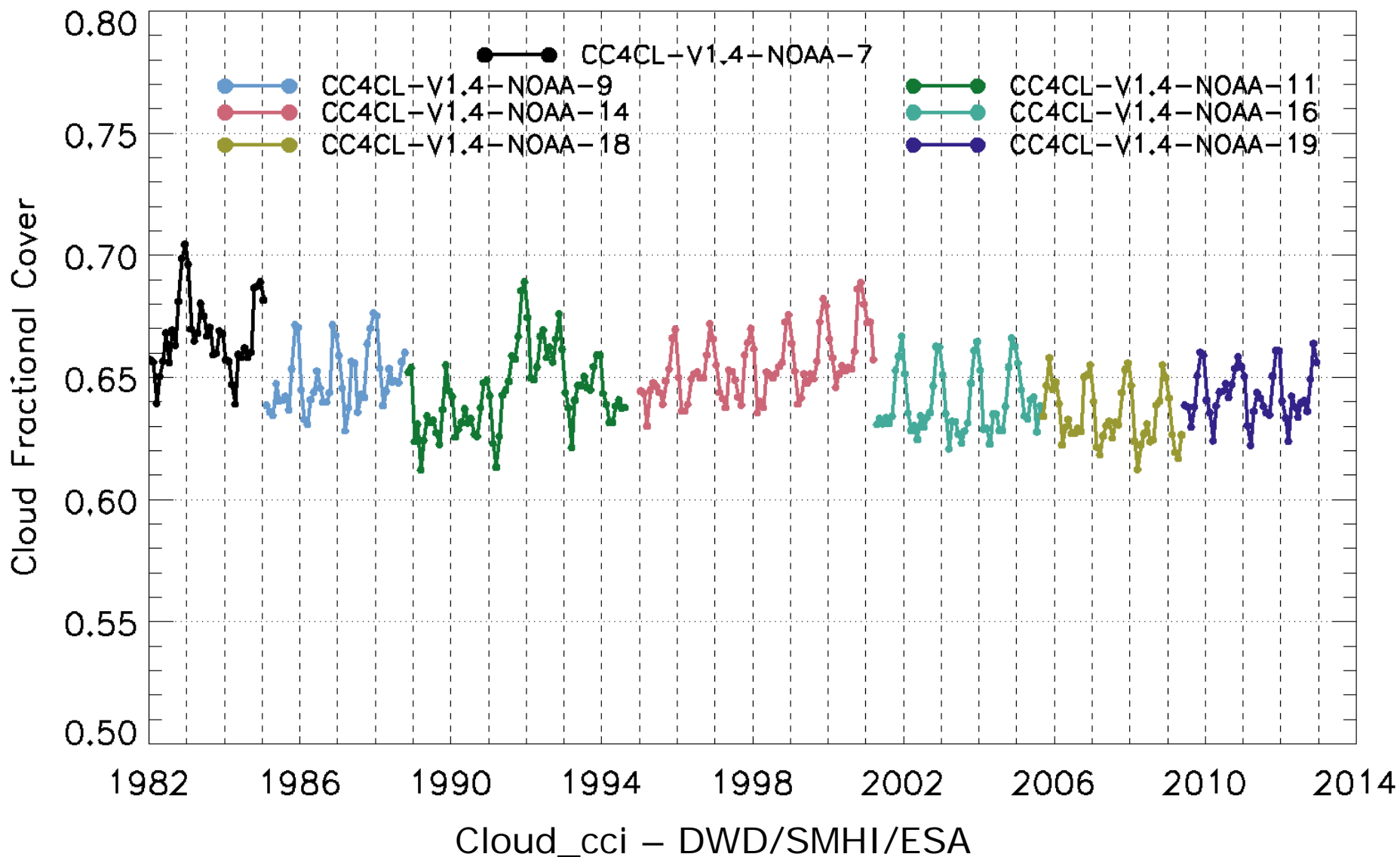


European Space Agency

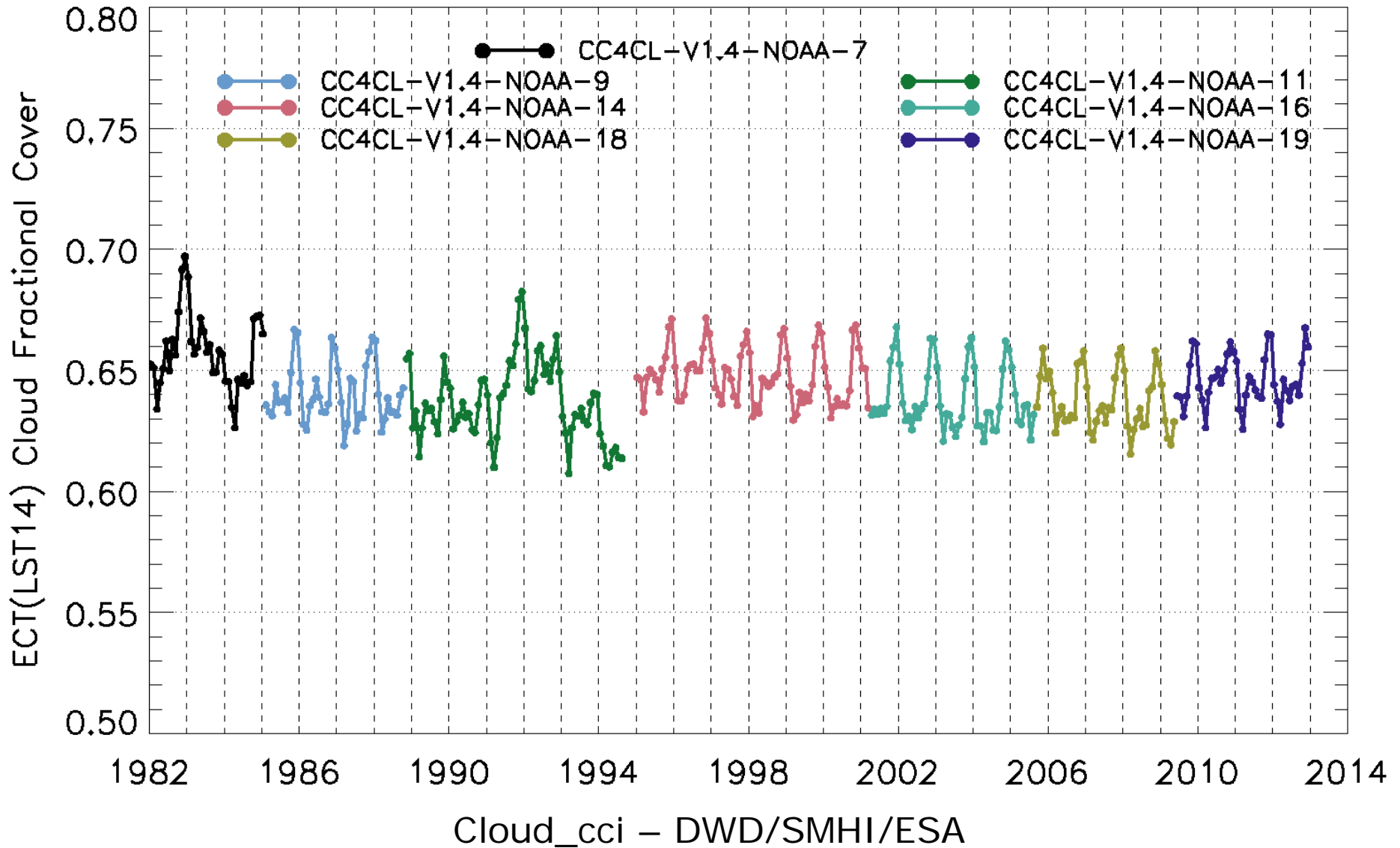
# Consistency: Overlap ATSR-2 to AATSR



# Consistency: AVHRR



# Consistency: AVHRR





## Overall Objective:

- To increase the uptake of satellite aerosol CDRs in climate research

## Questions

- What can we do to provide technically better quality multi-satellite aerosol CDRs ?
- Are there things we can do to improve the historical FCDR?
- Would it be useful to develop ensemble products? (e.g. in obs4MIPs format, hosted on the ESGF = "SatAerDIP" ?)
- How do you validate long term stability when the in-situ network is changing?
- Are there ways we can improve consistency between aerosol products?  
E.g. harmonise defn of retrieved properties? harmonised defn of uncertainties?
- Can coordinated action help to "join up" satellite based aerosol time series?  
e.g. AVHRR/MODIS/VIIRS, ATSR-2/AATSR/SLSTR, MVIRI/SEVIRI