climate change initiative

→ CLIMATE MODELLING USER GROUP

Description of WP 3.10 and 3.11:

- Assessment of the potential of CCI/CCI+ data to constrain mineral dust simulations at the regional scale
- Production of a pilot dust reanalysis at the regional scale

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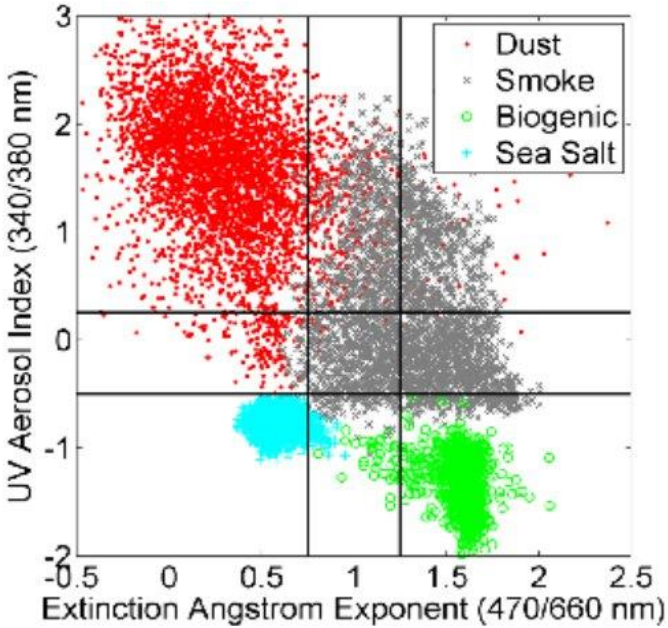
WP 3.10 & 3.11 - Motivations

Current aerosol (and dust) data assimilation is mainly based on retrievals in the visible part of the electromagnetic spectrum, and with no information on aerosol speciation

IASI dust retrievals have the potential to overcome these drawbacks. A previous CCI case study made by BSC showed the potential of IASI for dust DA but with a few important limitations.



(Vries et al., 2015)

WP 3.10 & 3.11 - Motivations

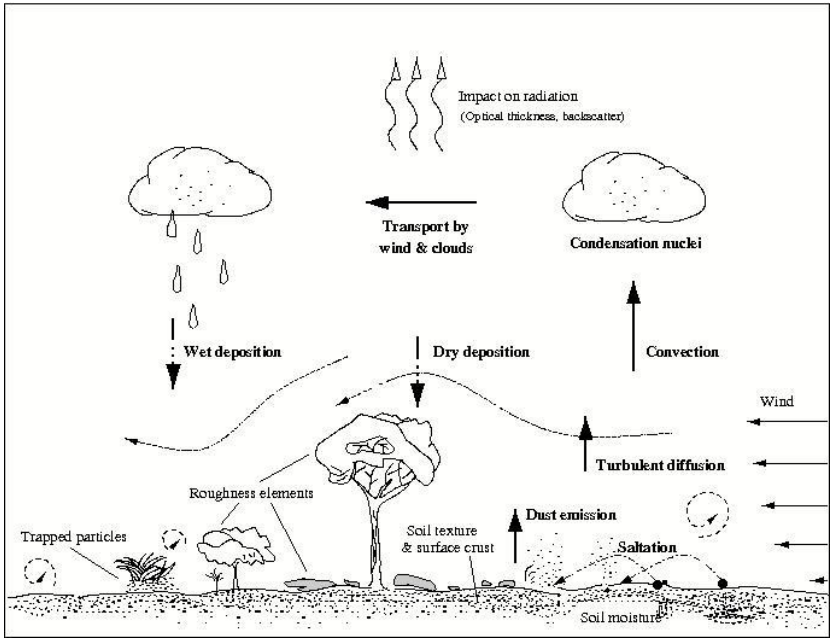
Current use of Land Cover information in dust models is provided at a coarse resolution and is related to green vegetation only.

Possible ways to use new HRLC data:

- Improve parameter estimates used in meteorological and land-surface modules

- Move from universal to land-cover-type dependent parameters to calculate surface characteristics in dust model

Surface characteristics are important for dust emissions



(Shao, 2008)

WP 3.10 - Description

WP3.10: Assessment of the potential of CCI/CCI+ data to constrain mineral dust simulations at the regional scale

ECVs involved: Aerosol dust and High Res LC

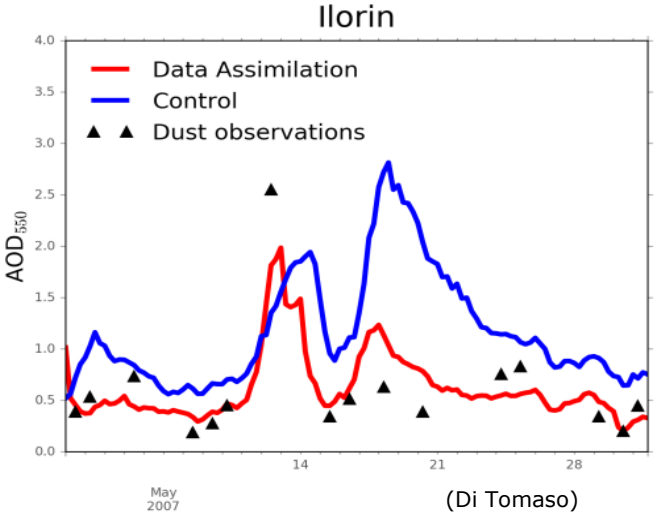
CCI IASI dust data will be assimilated in model simulations, while CCI+ high resolution land cover data (once data will become available) will be used to enhance the NMMB-MONARCH's land use type, with a consequent impact on dust emissions

WP 3.10 - Aims

Aims:

- demonstrating the use of CCI/CCI+ data to produce **dust analyses** at the regional scale;

- assessing the **synergy of CCI aerosol** data (in particular when constraining atmospheric concentrations over dust source areas) **with CCI+ land cover** data (used for an enhanced characterization of dust emissions);



(Di Tomaso)

- set the **basis** for the assessment activity 11 on the production **of a pilot dust reanalysis**, where the impact on dust cycles at different temporal scales will be evaluated.

WP3.11: Production of a pilot dust reanalysis at the regional scale

ECVs involved: Aerosol dust and High Res LC

CCI IASI dust data will be assimilated in model simulations for the reanalysis period. Simulations will make use also of CCI+ high resolution land cover data, once these will become available, in order to enhance the NMMB-MONARCH's land use type.

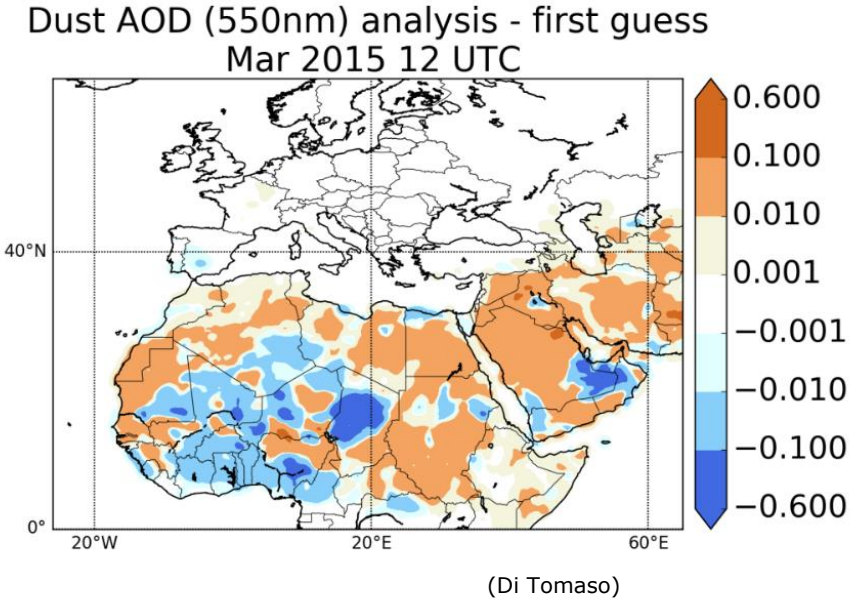
WP 3.11 - Aims

Aims:

- producing **a pilot dust regional reanalysis** based on CCI/CCI+ data, over a 1 year period

- detection of **systematic (spatial and temporal) patterns of data impacts** on the dust analysis through statistics of innovations

- assessing whether their integration in model simulations can improve the **monitoring of mineral dust** and the characterization of **dust cycles**



(Di Tomaso)

WP 3.10 & 3.11 - Experiments

Planned experiments:

- Control, Ensemble free-run, IASI-DA, LC + IASI-DA using the BSC dust model (ensemble-based DA)

Use of uncertainty:

- retrieval pixel-level uncertainty will be used to characterize observation error statistics

Assessment of consistency:

- study analysis increments by dust source areas with/without updated information on LC

WP 3.10 & 3.11 - Interactions

Planned interactions:

- CCI+ ECV teams: LC, HRLC teams

Initial discussions: domain, variable values&types, temporal resolution, period, format

- CCI ECV teams: email discussion started with ULB (C3S ECV)
- Interactions also via a web-based project managing tool (e.g., Trello)
- **External**:
  - DustClim consortium (dust reanalysis)
  - WMO SDS-WAS hosted by BSC/AEMET

Links within CMUG: Aerosol global reanalysis (ECMWF)