Internship Elisa Bergas – Work plan draft

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Topic: Relationship between modeled dust emission and dust optical depth – magnitude and frequency of occurrence

Duration: 3 months

Background: We are currently using the frequency of occurrence (FoO) of dust optical depth (DOD) above a given threshold as model input for potential dust source areas, assuming that the highest DOD-FoO values occur where dust is emitted. In other words, we are using DOD-FoO as an indirect proxy for dust emission. As DOD is obtained from satellite, there is likely some discrepancy between the (unknown) areas of dust emission and its magnitude and the observed areas of large DOD and FoO. The objective of this internship is therefore to investigate the relationship between dust emission and dust optical depth spatially and temporally with focus on their magnitude and FoO. For this purpose, we will use model data for which both dust emission and DOD are known. Outcomes of this internship will inform future model development and research on the global dust budget.

Work plan:

- Familiarize with R (if needed)
- Develop a script to
 - Read modeled dust emission
 - o Read modeled DOD
 - Investigate statistics on the relationship between modeled dust emission and DOD (magnitudes, correlation, time lag)
 - Calculate FoO of a quantity, e.g. DOD, using the input and output temporal resolution and threshold as an input
 - Investigate FoO for dust emission and DOD based on previous insights on magnitudes of emissions/DOD
 - Test dependence of results on time basis (e.g. per day, month, season)
- Summarize results in a report
- Optional: Familiarize with ET and implement FoO computation
- Optional: Learn how to run nmmb-monarch for a dust event and repeat tests using the new script

The work will be conducted using an existing simulation for 2012, starting with a short time period, e.g. 1 month. Details on the simulation to be used etc. will be provided as needed.