Identifying African mineral dust sources and tracking dust events towards the Amazon Basin

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Mineral dust from the Sahara and Sahel provides the Amazon Basin with essential nutrients, although the process is still poorly understood. There is little understanding where the dust is coming from, and thus what the concentration of nutrients in the dust is. This information, however, is vital to assess the impact it will have on the Amazon.

This study utilises numerous types of remote sensing data to map dust sources and then track the dust events to the Amazon. The SEVIRI dust RGB and VIIRS dust RGB are used alongside high resolution (10 m) data from Sentinel-2 to determine the location of dust sources precisely. A combination of the VIIRS dust RGB and MODIS aerosol optical depth (dark target and deep blue) is subsequently analysed to determine dust mass. Finally, MODIS AOD is currently being evaluated as a method to track dust events from Africa over the Atlantic to the Amazon.

The ten largest dust events in the 2016-2017 winter dust season have been analysed. Results indicate that the majority of the dust originates from either paleorivers or paleolakes located mostly in Niger, Chad, and Sudan. Furthermore, Lake Megachad shorelines are observed to produce dust, yet very few dust sources are found in areas of sand dunes. Well-known dust source areas such as the Bodélé Depression show up prominently, however, various other lesser- and unknown dust source areas are identified. The ability of remote sensing to track these dust events towards the Amazon is currently being analysed and initial results will be presented.