

## **Side Event on the Bodele Phenomenon, Chad:**

### **Connector across multiple climate and ecosystem processes**

**25 May 2014 Cancun**

#### Background

Chad is home to one of the most special physical features on the planet. The Bodele Depression is a unique exemplar of inter-connected Earth System processes linking Earth's surface, atmosphere, ocean and biosphere in Africa, across the Atlantic Ocean as far as South America. The Bodele in northern Chad is a dried-up lake bed widely regarded as the world's single largest source of dust (mineral aerosols). Each year many tens of million tonnes of Bodele dust are emitted and then transported across West Africa, and the tropical Atlantic with some of the dust from the Bodele reaching the rainforest of the Amazon basin. Dust plays a multiple role in the global ecosystem. It modifies climate by a) reflecting sunshine but absorbing radiation from the Earth b) changing cloud characteristics and rainfall c) increasing the uptake of carbon dioxide from the atmosphere to the biosphere by fertilising phytoplankton in the ocean and plants in ecosystems like the Amazon forests. Dust is vital to ecosystem functioning owing to the nutrients it provides, and as such, is a significant connector across multiple global ecosystems. These aerosol and bio-geochemical cycle feedback processes are amongst the biggest uncertainties in projections of future climate. Dust also impacts on human health and interferes with transport systems, particularly road and air. Despite its importance, our understanding of the Bodele Depression is still quite limited and stems mainly from the short duration (2.5 week) Bodele Dust Experiment (BoDEx) 2005 when one modest dust event was sampled in the depression. Therefore, a more detailed understanding of the Bodele Depression phenomenon is necessary to improve understanding and prediction of weather, climate and the functioning of terrestrial and oceanic ecosystems across this wide Africa-Atlantic-Americas domain, as well as critical climate system feedbacks that determine rates of future warming.

#### Objectives of the side event

To provide an overview of the scientific understanding of the Bodele Depression, its role in the climate system and regional terrestrial and oceanic ecosystems

To consider the implications of the inter-dependence of ecological, atmospheric and geomorphological processes, exemplified by the Bodele Depression for ecosystem services and environmental management

#### Outline of Programme

The following topics will be reviewed:

- State of knowledge and reasons the Bodele is the world's largest source of dust

- Intercontinental dust transport from Chad
- Bodele Dust and Ecosystem functioning
- Key unresolved issues

### Contacts

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