**Introduction**

In the countries of the Guinean Gulf, the population has been growing rapidly during the last decades. The sustained economic growth is associated with increased emissions from traffic, industries and households, and with high pollution levels. The coastal atmospheric dynamics may influence the transport of pollutants especially during the West African monsoon. We studied the transport of anthropogenic pollutants from May to July 2006, i.e. the monsoon onset period.

**What is the impact of meridional atmospheric cells on the transport of pollutants emitted from coastal megacities?**

**Cotonou-Niamey anthropogenic pollution**

**Surface concentration**

![Hovmoller diagram of surface PM2.5 (µg.m⁻³) due to anthropogenic emissions along a meridional transect from 2°N to 19°N and averaged from 2°E to 3°E including Cotonou (Benin) and Niamey (Niger). Day-to-day variability is smoothed by applying a moving average of ±2 days. White contours = 10mm.day⁻¹ precipitation. The black line is the ITD defined as RH isocontour = 20%.

The PM2.5 concentration seems to exhibit frequent northward transport events from the coast to the ITD. Precipitation explains a part of the variability.

**Is the Sahelian maximum due to local emission or/and pollutant transport?**

**Vertical structure June average**

![Vertical cross-section of the meridional wind along the Cotonou a meridional transect. Isocontours are PM2.5 concentration = 5, 4 and 3 µg.m⁻³. The vectors are meridional-vertical wind. green line = PBL.

Tracer experiment: Constant release from 1 to 30 June from Cotonou and Niamey. Transport from the coast and concentration over the Sahel.

**Niamey emission**

**Cotonou emission**

![Vertical cross-section of the meridional wind along the Cotonou a meridional transect. Isocontours are tracer concentrations averaged over 20 to 30 June at 00 UTC.

**Impact of coastal dynamics on anthropogenic pollution focus on 8 to 15 June**

At the surface level, there are periods of high concentration which are due to several city plumes. **What is the vertical structure of pollution during typical monsoon dynamics or disturbed situations?**

**Typical situation**

**Disturbed situation**

**Modeling**

WRF (weather model) and CHIMERE (chemistry transport model) on the same grid over a regional domain resolution 0.2° with HTAP anthropogenic emission dataset Centered on Cotonou Longitudes = 2° to 3°E

Anthropogenic particulate matter (PM) surface emission fluxes in kg.km⁻².day⁻¹

**Conclusions**

- Frequent northward transport events from the coast to the Sahel
- At the coast, anthropogenic PM2.5 is higher in June than in May or July
- Over the Sahel, a meridional atmospheric cell concentrate pollutants emitted locally and remotely from the megacities

- On 8 - 15 June, anthropogenic pollutants emitted along the coastline are exported toward the North at the beginning of the night (18 UTC to 00 UTC)
- Specific disturbed meteorological conditions associated with convection lead to high pollution level at the coast because different cities plumes overlay for some hours.

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