Estimate of dust emissions in the intertropical discontinuity region of the West African Monsoon

Diane Bou Karam¹, Cyrille Flamant ¹, Pierre Tulet ², Jean-Pierre Chaboureau ³ and Jacques Pelon ¹

¹ LATMOS/IPSL, CNRS, Université Pierre et Marie Curie, Paris, France. ² Météo France, CNRM/GMEI, Toulouse, France. ³ LA, CNRS, Université de Toulouse, France.

Contact: diana.boukaram@latmos.ipsl.fr & http://drdiana.free.fr

Characteristics of the ITD

- Embodied in a region of low pressure (i.e. the Heat Trough).
- Strong correspondence.
- Very weak wind speeds.
- Strong horizontal shear between the harmattan and the monsoon flows.
- Well-marked diurnal cycle (amplitude variation of 100-200 km/day).

Dust activity over North and West Africa

- The maximum in dust emissions over North and West Africa is observed during the transition season (June and July).
- This maximum corresponds to the lifetime of the West African dust sources which cover a large area of West Africa.

Mechanisms involved in dust emission

- Contribution of the different mechanisms
- Discussion & Conclusions

Dust emission and transport in the ITD: Synergy between observations & mesoscale modelling

- Dust emission at the leading edge
- Dust emission associated with vortices
- Diurnal cycle of dust emission in the ITD

Estimate of dust loads

- Model calculated dust load
- Built-up from surface

Dust emission over North and West Africa

- The maximum in dust emissions over North and West Africa is observed during the transition season (June and July).
- This maximum corresponds to the lifetime of the West African dust sources which cover a large area of West Africa.

Mechanisms involved in dust emission

- Contribution of the different mechanisms
- Discussion & Conclusions

Dust emission and transport in the ITD: Synergy between observations & mesoscale modelling

- Dust emission at the leading edge
- Dust emission associated with vortices
- Diurnal cycle of dust emission in the ITD

Estimate of dust loads

- Model calculated dust load
- Built-up from surface

Discussion & Conclusions

- The daily mean dust load associated with strong surface winds on both side of the ITD is estimated to be in the order of 3 Tg over the study domain.
- The daily mean dust load associated with strong surface winds south of the ITD is evaluated to 0.7 Tg.
- Dust emissions driven by strong surface winds occurring on both side of the ITD while laying across the Sahel may contribute significantly to the total dust load observed annually over West and North Africa.

Related References