



Situation on Atmospheric dust in Togo: causes, impacts and Observation and forecast tools

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Introduction 1/3

- ✓ Atmospheric dust plays a major role in several aspects of the Earth System (Washington & Todd 2005)
 - Earth climate system through the earth radiation budget, cloud properties, the atmospheric circulation, and global bio-geochemical cycles
 - Human activities such as transportation and human health
- ✓ Understanding and modeling dust dynamics: vital for the prevention and mitigation of the impacts of dust on ecological and socio-economic systems and human health especially in WA

Introduction 2/3

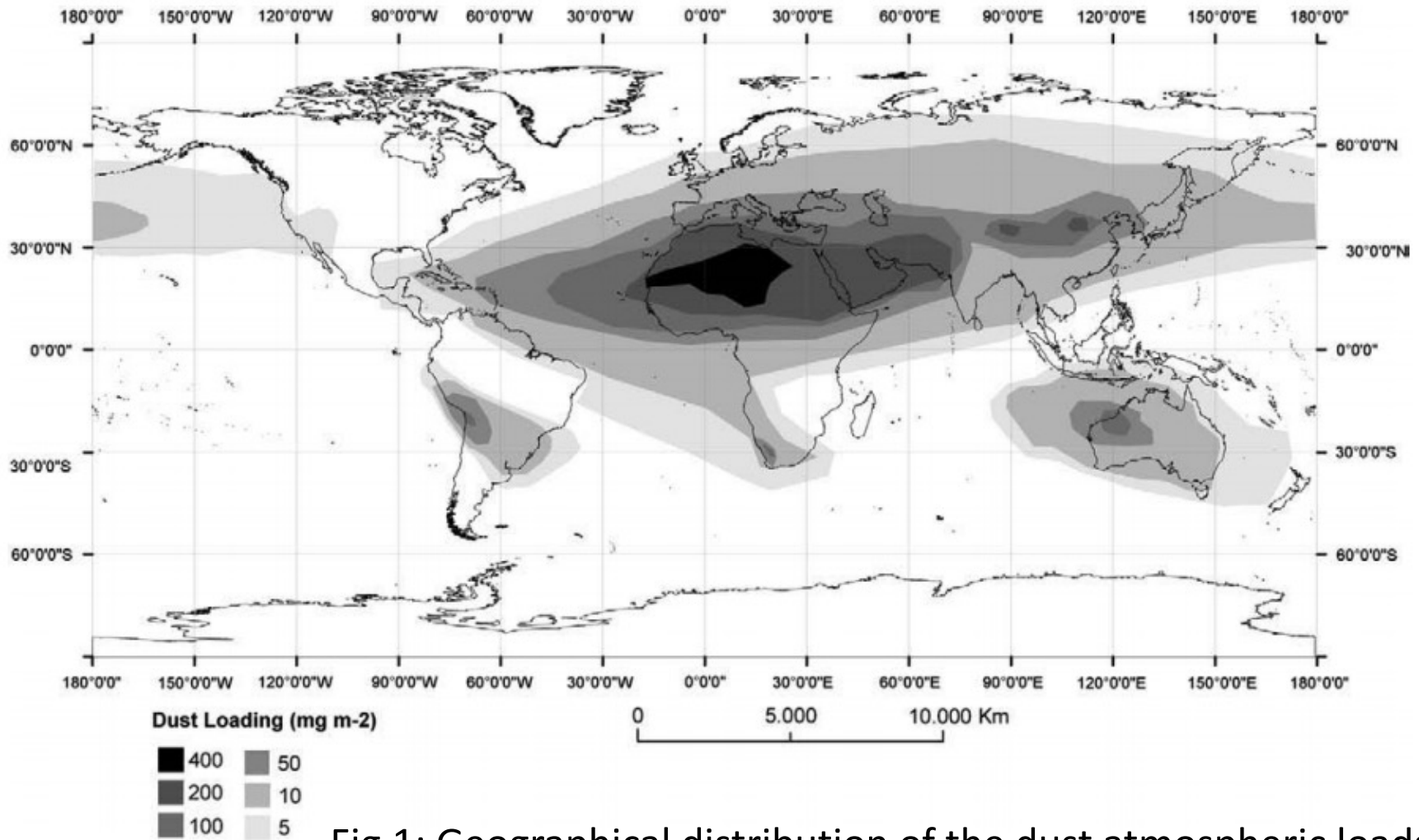


Fig.1: Geographical distribution of the dust atmospheric loads (Tanaka and Chiba, 2006; De Longueville *et al.* 2010)

Introduction 3/3

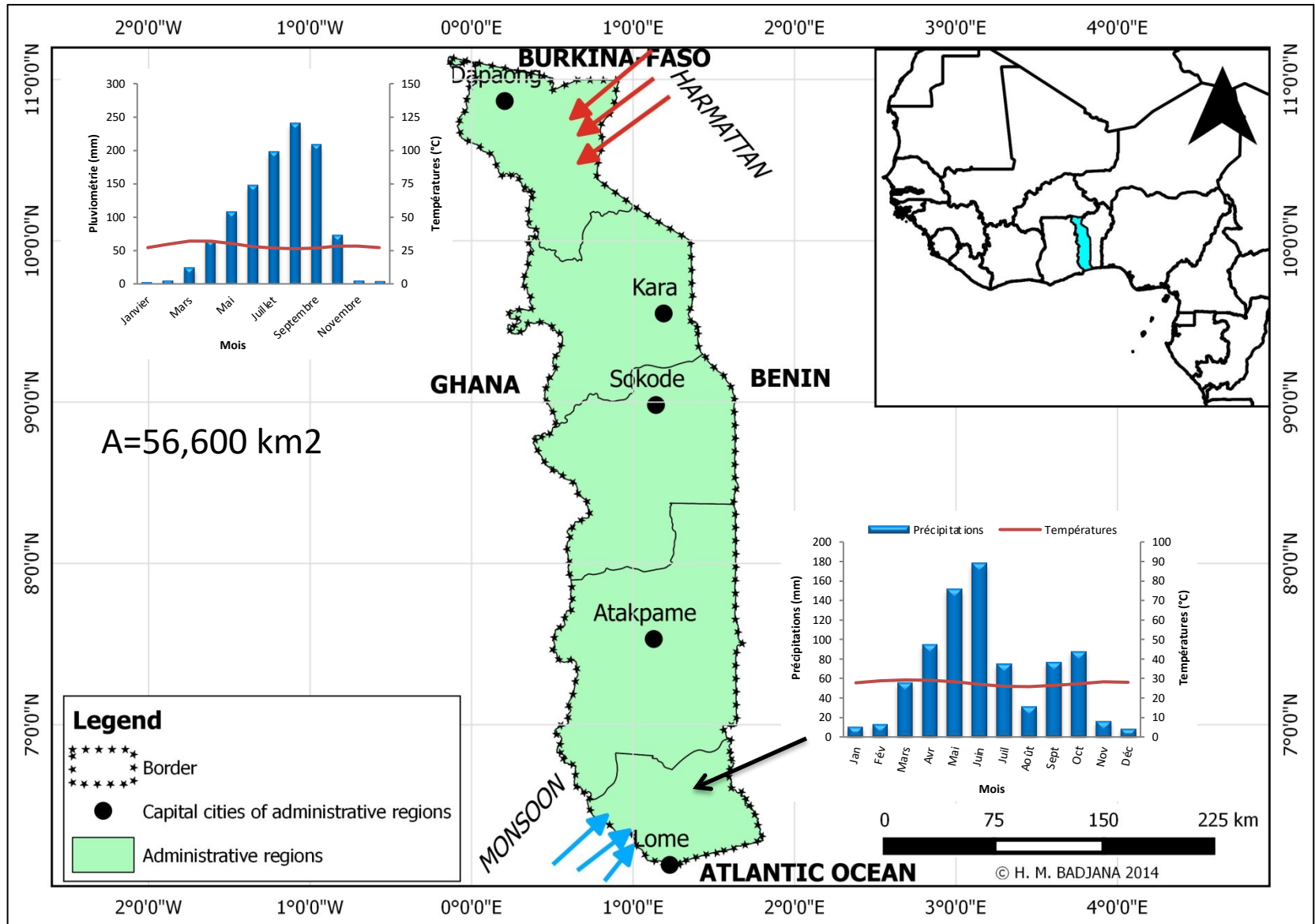
- ✓ However, in many West Africa countries like in Togo that are constantly affected by atmospheric dust (Sunnu 2012) :
 - Very little scientific research has been carried out
 - Forecast is still a challenge

Due to the lack of competencies, appropriate technologies and tools, and collaboration and interaction between disciplines

- ✓ Knowing the state-of-the-art: useful for information and knowledge sharing but also for capacity reinforcement

The aim of this presentation is to give an overview of the situation on atmospheric dust causes and impacts and its forecast in Togo

Presentation of Togo



Cause of atmospheric dust in Togo 1/2

❖ Harmattan: main cause

- ✓ Hot, dry and dusty wind
- ✓ Northeasterly wind blowing across the Sahara Desert towards the Gulf of Guinea
- ✓ When High pressure system stays over the central Sahara Desert and when a low pressure system stays over the Gulf of Guinea

❖ Other causes: local wind, bush fires, industries

❖ Non-Harmattan (monsoon) dust particles : Atlantic sea salts, pollen, mechanically generated anthropogenic particles - agricultural activities, products of fuel combustion, industrial fumes, construction sites etc. (Sunnu 2012)

Cause of atmospheric dust in Togo 2/2

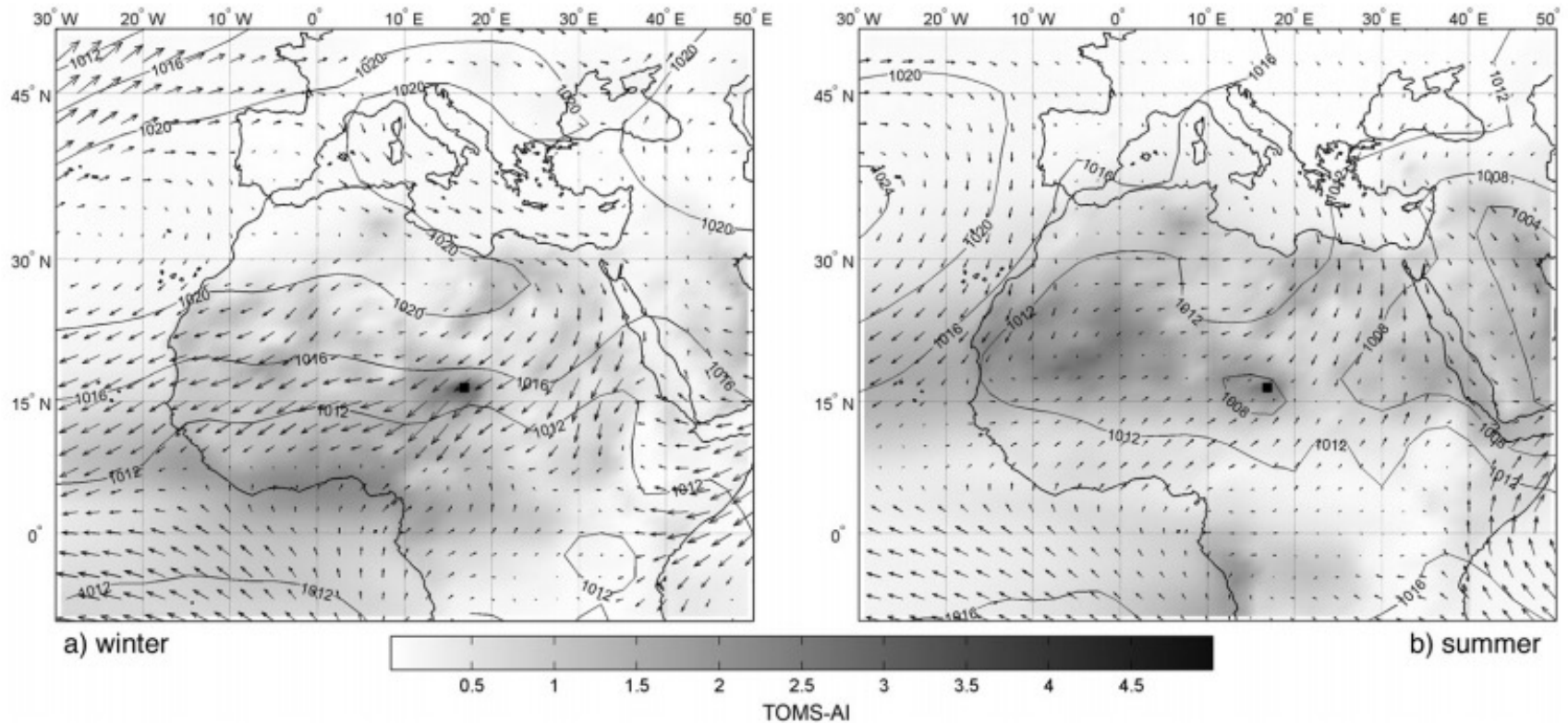


Fig. 1. Mean annual atmospheric mineral dust concentrations quantified by TOMS aerosol index (dimensionless) and NCEP/NCAR horizontal wind vectors at 925 hPa in winter (December to February) and summer (June to August) during the years 1978–1993.

The black square indicates the location of the Bodélé Depression (**Schwanghart & Schütt, 2007**)

Impacts of atmospheric dust in Togo

- ❖ Reduction of visibility: disturbance of road and air traffic



- ❖ Air pollution with subsequent on health: flu, asthma and other respiratory tract infections and diseases
- ❖ Soiling of materials in the environment

Tools for atmospheric dust observation and forecast in Togo

Observation

No available tools for in-situ atmospheric dust observation

- Characterization of visibility : measure of the opacity of the atmosphere (estimated visually)

Forecast

- ✓ Use of satellite images
- ✓ Combination of satellite images in RGB, wind direction and speed
- ✓ Use of ground-based dust observation for verification and validation
- ✓ Use of models: MetOffice models, SYNERGIE, etc

Conclusion and Outlook

- ✓ Togo is one of the countries that are highly affected by atmospheric dust
- ✓ Scientific research on the dust and its impacts on human health is still lacking
- ✓ Given the effects on air pollution and subsequent impacts on human health & activities and the evidence that effects will increase in next years, necessity to enhance research and improve forecast by uncertainties reduction. This requires:
 - Capacity building
 - Improvement and reinforcement of observation systems
 - Interaction between scientific disciplines
 - Further collaboration with other institutions

THANKS FOR YOUR ATTENTION

