

Improved sub-seasonal forecasts to support preparedness action for Meningitis outbreaks in Africa

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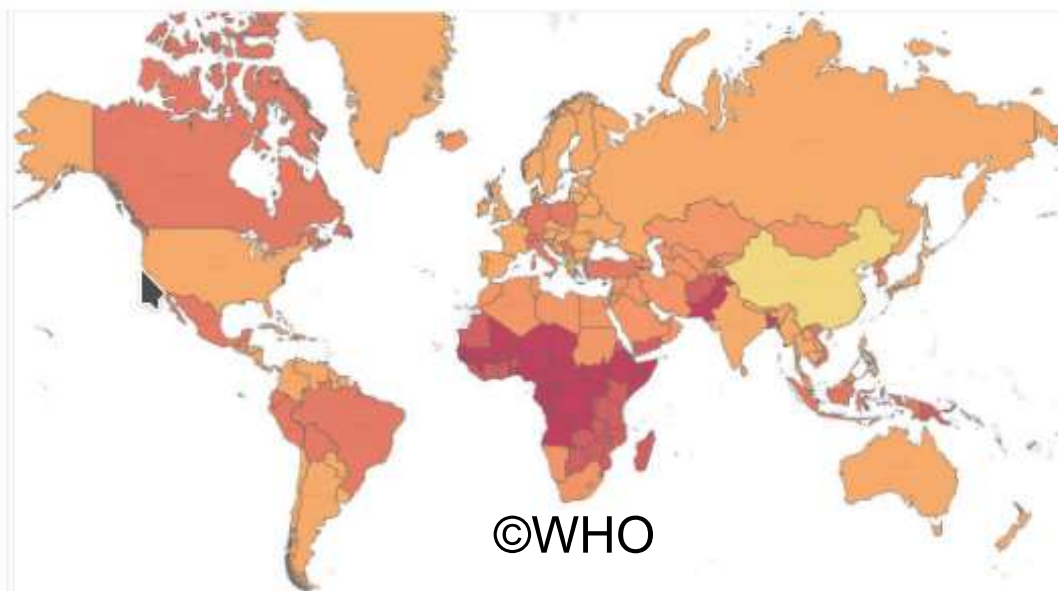
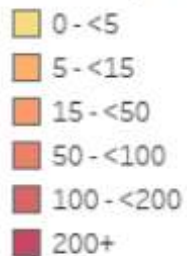
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Why forecasting Meningitis outbreaks?

Meningitis incidence

Incidence (cases per 100,000)



Climate sensitive disease
associate with several serogroups

Very large outbreaks in Africa

Meningitis epidemics develop during the dry season and end at the monsoon onset over West Africa (*Sultan et al., 2005, Yaka et al., 2008, and Martiny and Chiapello (2013)*)

MERIT project funded by WHO

Thompson et al., 2013

- ◆ SWIFT's sub-seasonal to seasonal Testbed to develop useful climate information services to support decision-making over Africa
- ◆ Co-production to support WHO AFRO to prevent and control meningitis outbreaks in the African

Meningitis belt

Co-production approach

- **ACMAD**, Pan-African institution, **SWIFT partner**, producer of weather and climate information services
- &
- **WHO AFRO**, user, coordinating meningitis actions over the African meningitis belt countries

- S2S forecast data from ECMWF provided by SWIFT S2S testbed through WMO's Sub-seasonal to seasonal prediction project
- Temperature, Relative Humidity, and latest available dust forecasts from ECMWF
- Bias correction using the Hindcast and ERA5 data
- ERA5 to evaluate S2S forecast data and investigate case study
- Reported meningitis cases by WHO AFRO to evaluate meningitis vigilance levels

Co-developed solution

Based on standard operation procedure (SOP)

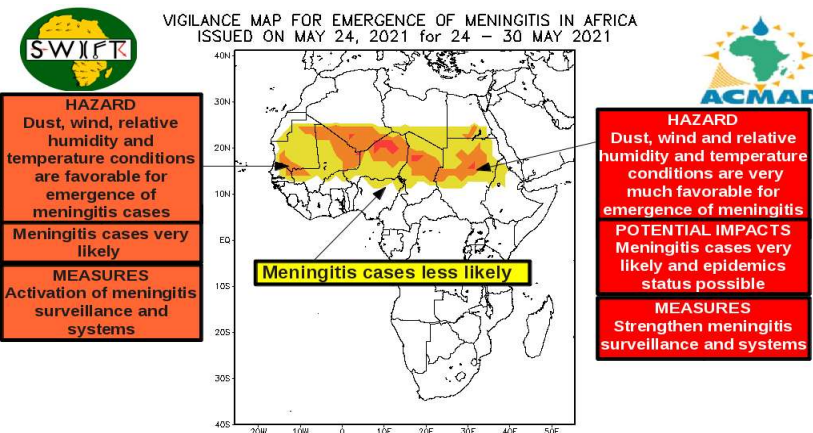
Vigilance levels

Red: very dry ($RH \leq 20$); warm and very dusty

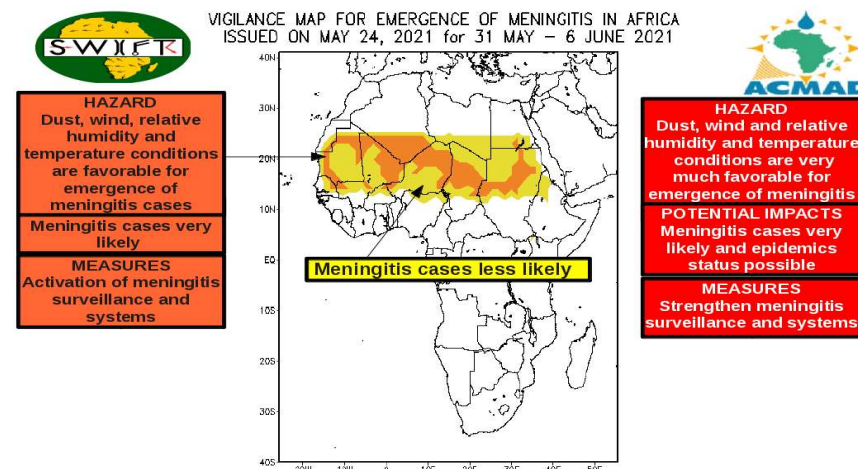
Orange: $20 < RH \leq 40$; moderate dust and moderate to warm temperature

Yellow: $40 < RH \leq 60$ %, low dust and moderate to warm temperature

Week 1



Week 2



Co-delivered solution

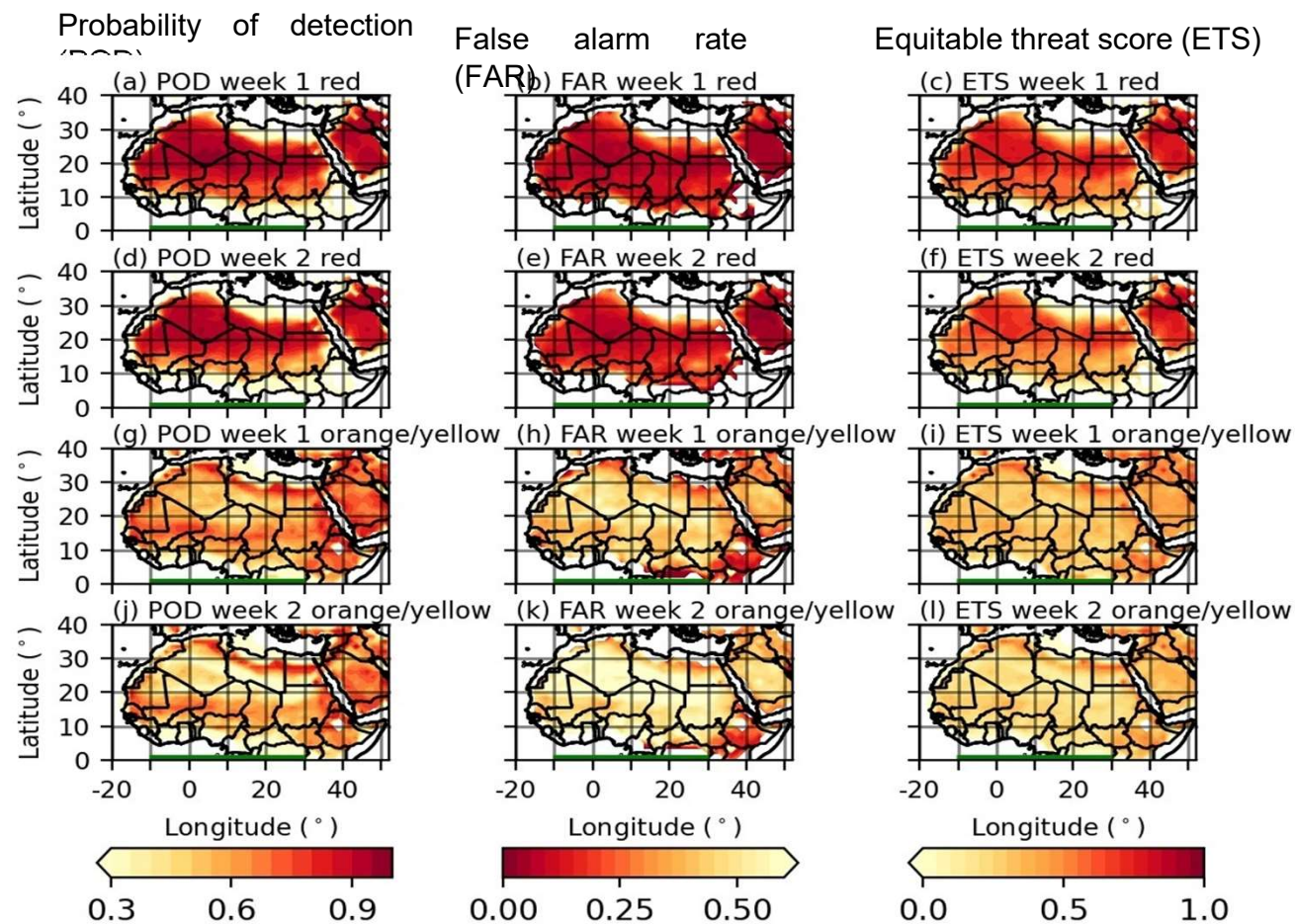
Weekly Meningitis Early Warning (MEW) issued on Monday (from week 1 to 26)

- ➔ MEW send by email to **WHO AFRO** which shares the bulletin to health services in each country and technical supports (**CDC, UNICEF, MSF, etc.**)
 - ➔ Alerting countries for preparedness and awareness for meningitis epidemics
 - Fortnight meeting to discuss: epidemiological situation; meningitis early warning, control measures implemented; constraints and expectations
 - Reinforcement of surveillance system for the 2 or 3 coming weeks
 - Coordination of immunization – request for vaccine doses to ICG,
- WHO AFRO is giving quarterly feedback on MEW

Evaluating S2S forecasts

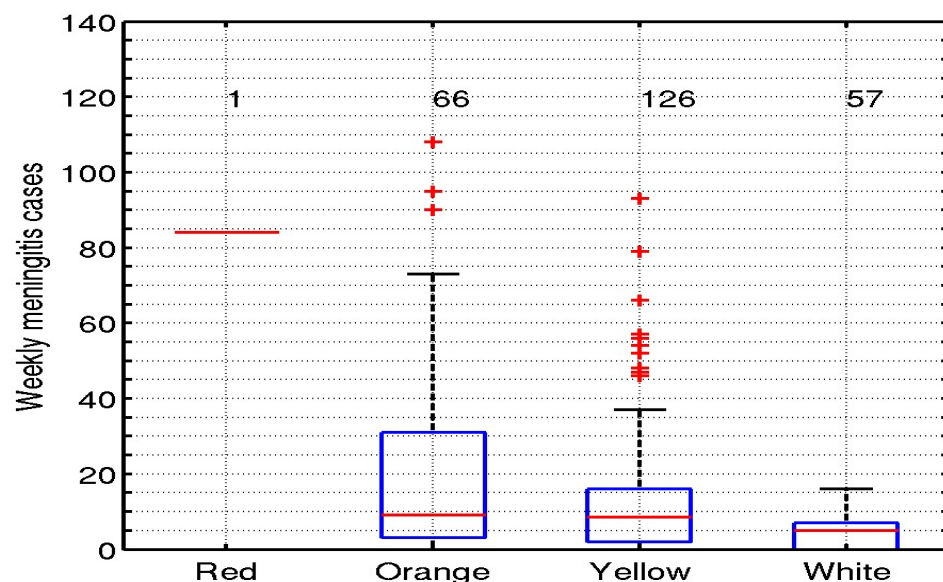
- High skill at predicting extreme dry and warm conditions (red vigilance)
- Less predictive skill for atmospheric conditions typical of orange/yellow vigilances

Jan – June 2021



Evaluating meningitis vigilance levels

Weekly Meningitis cases & vigilance levels
2021



Vigilance levels captured the intensity of meningitis cases – climate metrics threshold used are consistent with meningitis cases

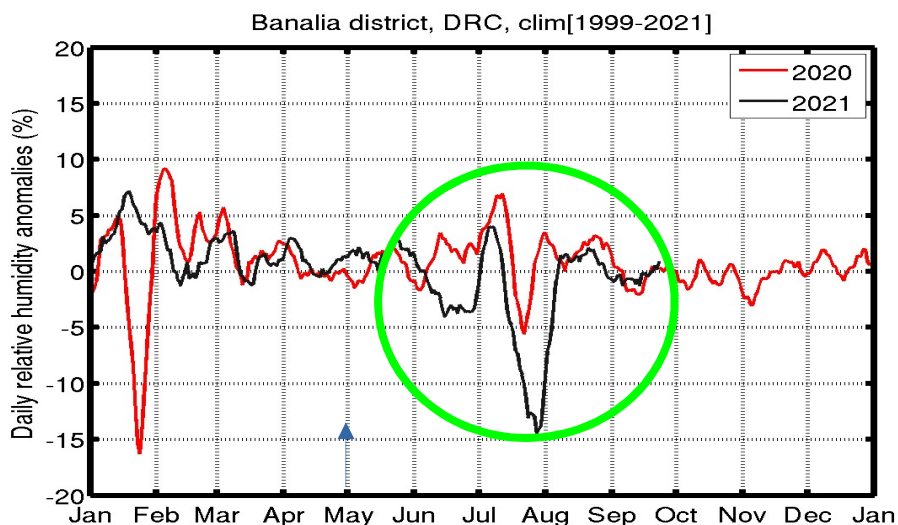
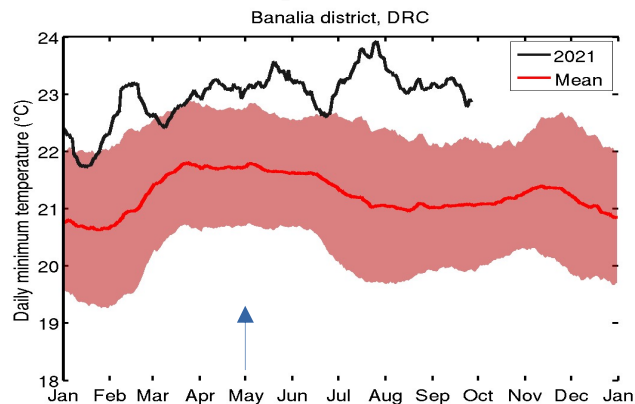
Challenges

- Red vigilance over uninhabited or inaccessible area in the meningitis belt
- Meningitis cases are reported at country level with discontinuity
- Specificity of meningitis transmission (close contact)

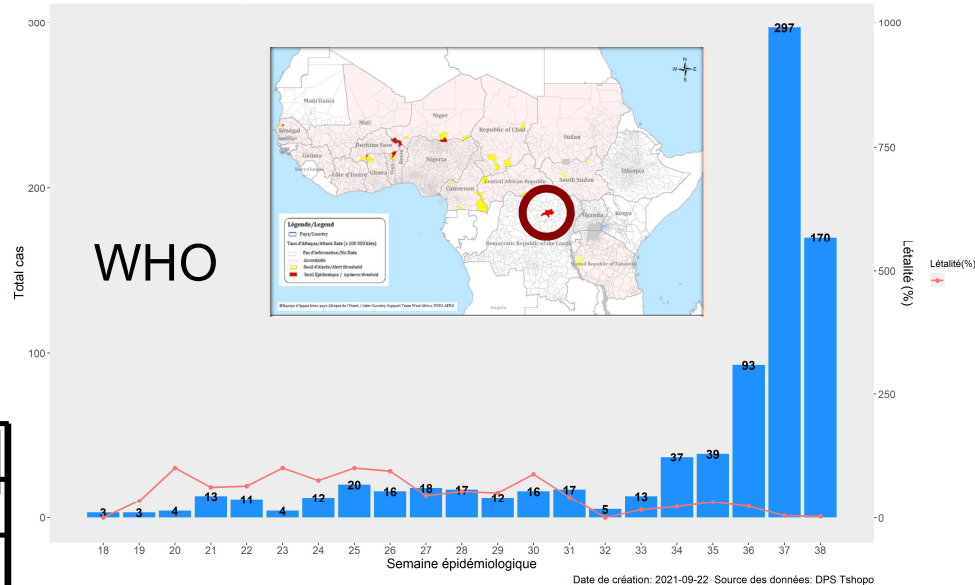


Co-developing research questions

Case study of meningitis epidemic in Banalia, DRC



Evolution des cas de meningite et létalité S18- S38 ZS Banalia



What are the climate metrics linked to meningitis outbreaks over Central Africa (wetter than Sahel)?
What are the serogroups associated with epidemics?

Summary

- Built capacity for climate scientists on co-production and skills on generating useful climate information services associated with SOP.
- Health services free access to useful and accurate climate information services allowing to save lives and dommmages associated to meningitis disease
- Climate scientists to evaluate their forecasts and develop research questions (meningitis outbreaks over Central and East Africa)
- Developed a road map of Country prioritization for implementation of the Regional Framework to Defeat Meningitis in Africa by 2030 – climate information
- Strengthening this co-production by developing new weather/climate information services for other diseases (Malaria, Rift valley fever, Cholera, etc.) in the framework of ClimSa project.

Thank you for your attention !

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