Observatorio Latinoamericano de Eventos Extraordinarios

OLE²

Research Priorities for the Development of Climate Services in Latin America

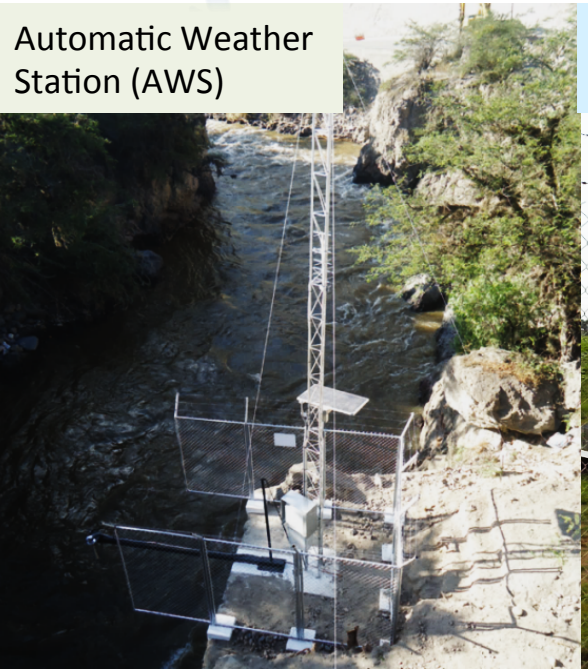
INAMHI
INSTITUTO NACIONAL DE METEOROLOGIA E HIDROLOGIA

OLE²

1 Observations & Monitoring

Station Network

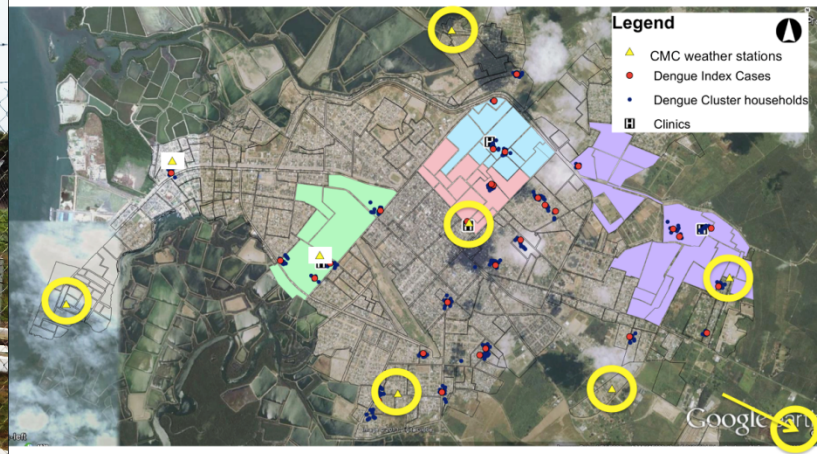
Automatic Weather Station (AWS)



Conventional Weather Station

Tailored data loggers (CMC-Ícaro)

Integrating climate-dengue surveillance



Machala, El Oro Province

Merging Satellite and Local Observations

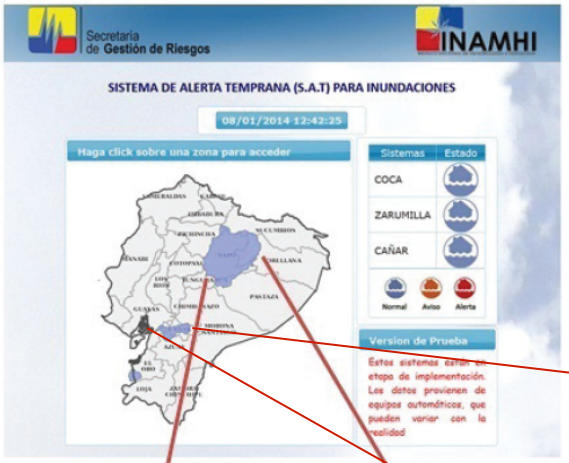
In our countries, with low density stations, the merge of satellite products and station data seems to be a promising approach (e.g. IRI's ENACTS in Africa).

Why we need all this? It's key to understand the past and present in order to provide information about the future. More efforts in characterizing the variability of the recent past.

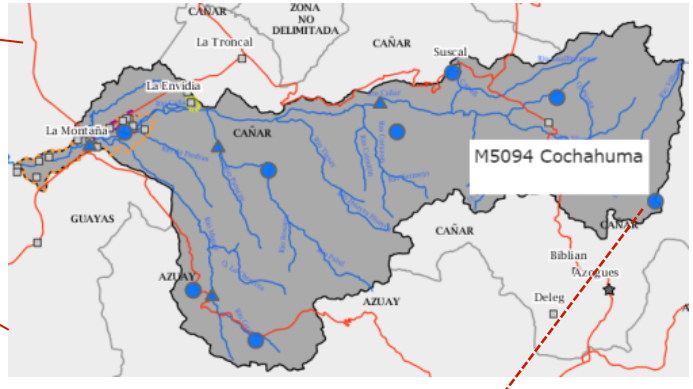
Observations & Monitoring

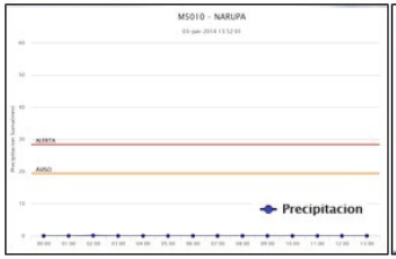
Early Warning System (EWS, or SAT in Spanish)

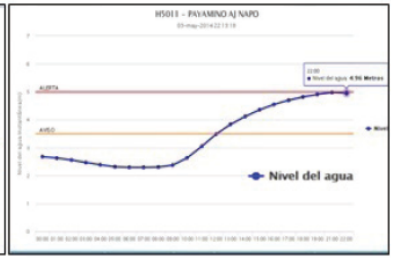
SAT Coca

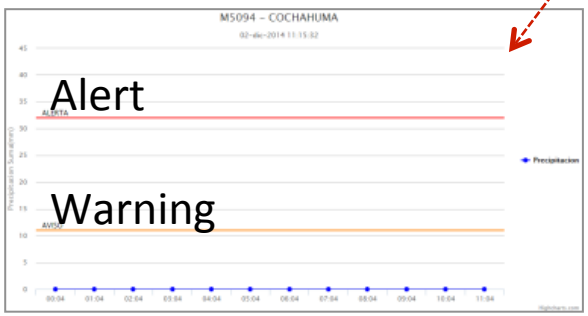


SAT Cañar









2 Modelling & Prediction

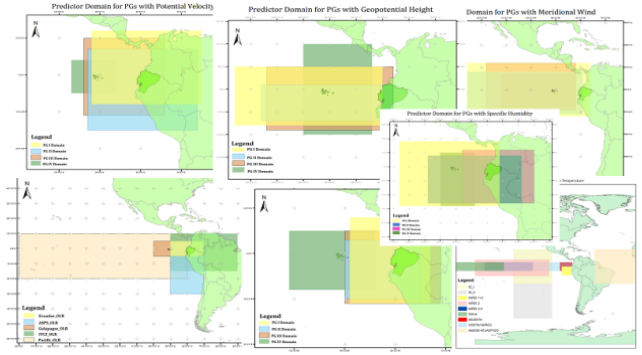
Seasonal Prediction

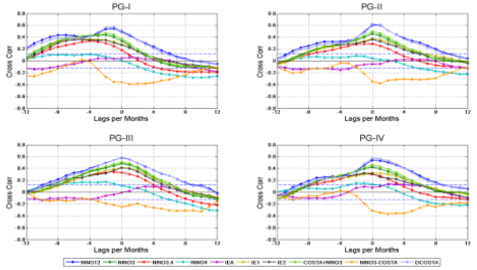
+ Formal predictability study [Recalde et al., 2014], best predictors [INAMHI-SENESCYT Project, 2013-2015].

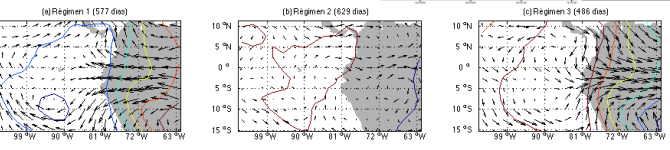
+ Additional methods: Box-Jenkins [Bravo-de-Guenni et al., submitted], weather types [Muñoz et al., 2014, submitted]

+ Probabilistic Forecast Verification

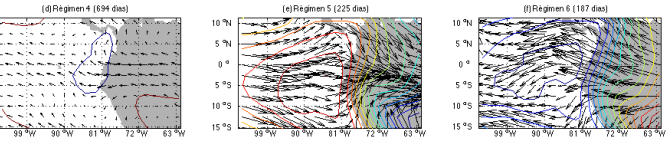
Best predictors

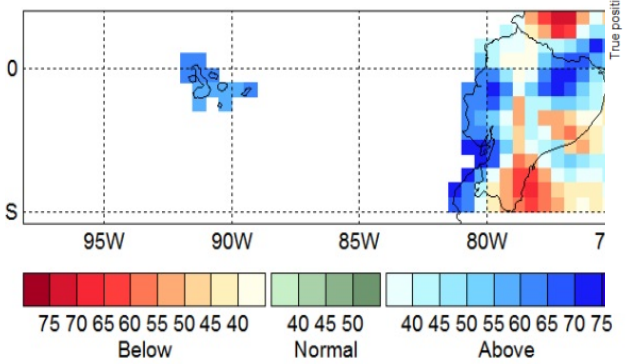




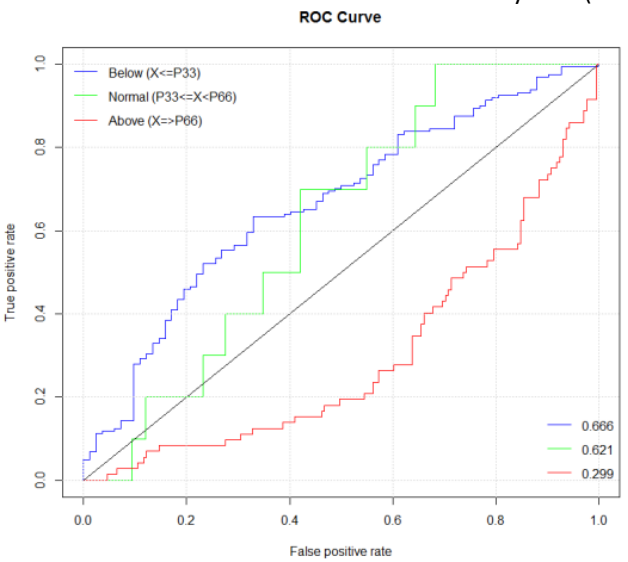


Weather Types





IRI's Climate Predictability Tool (CPT)



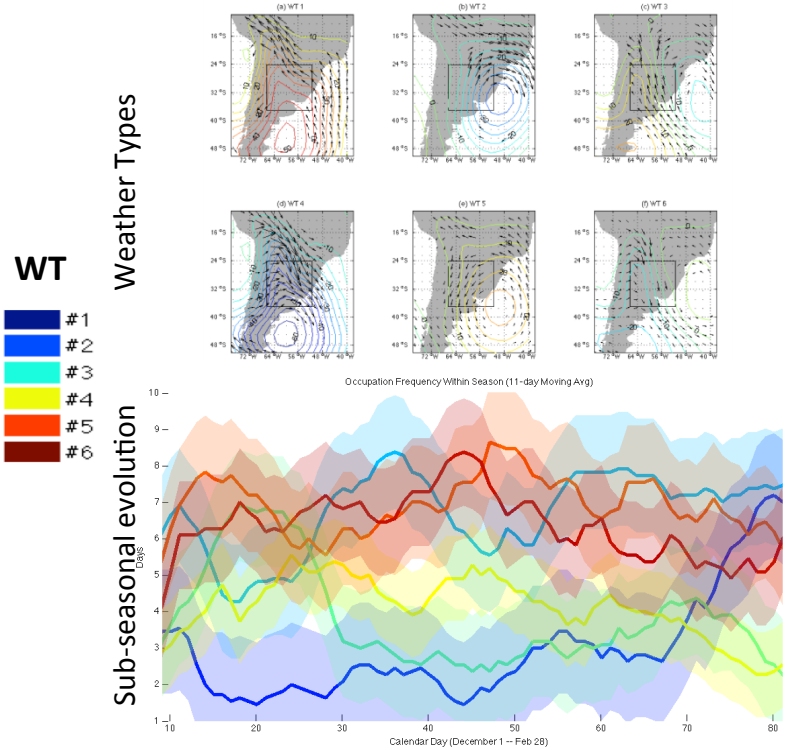
Verification

2 Modelling & Prediction

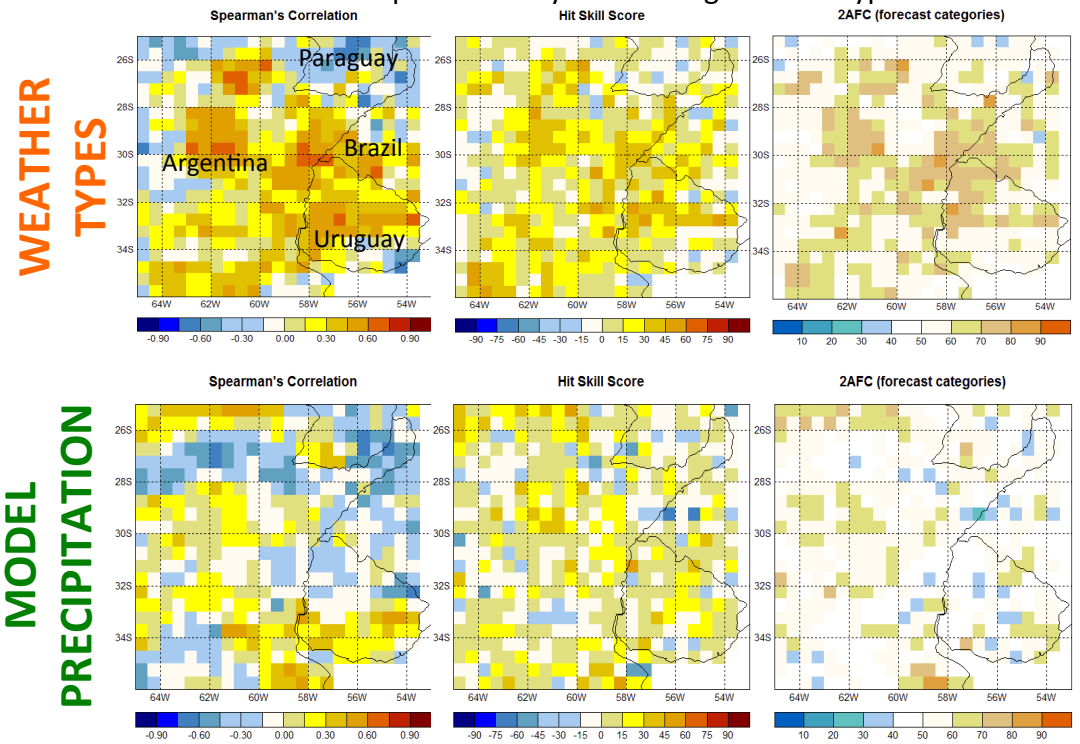
Sub-Seasonal Prediction

+ *Required* by the users (specially the agriculture sector)

+ Promising results in South East South America using a methodology based on weather types [e.g., Muñoz et al., 2014, J. Clim, submitted]



Increased predictability when using weather types



3 Involving the users

- Improve communication
- Uncertainty management
- Required products
- Working *with the user*, not for the user

Forums are held in different provinces of Ecuador **Since 2010**

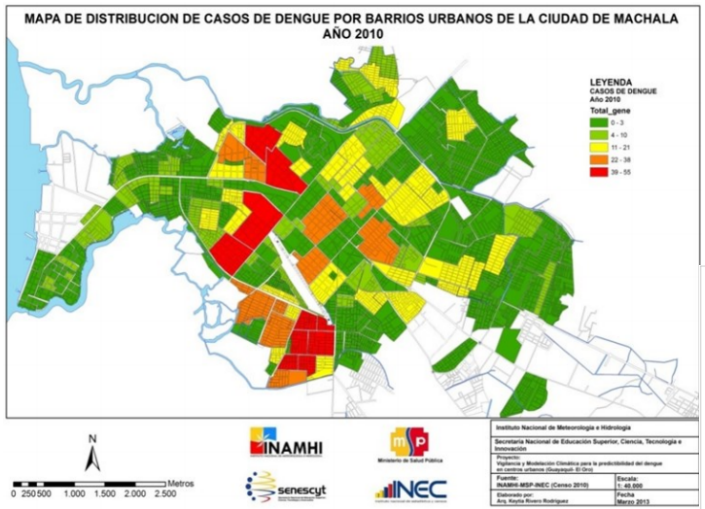
Manabí

Sucumbíos

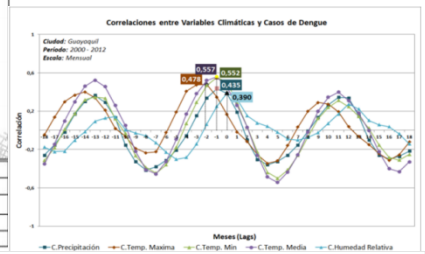
Zamora Chinchipe

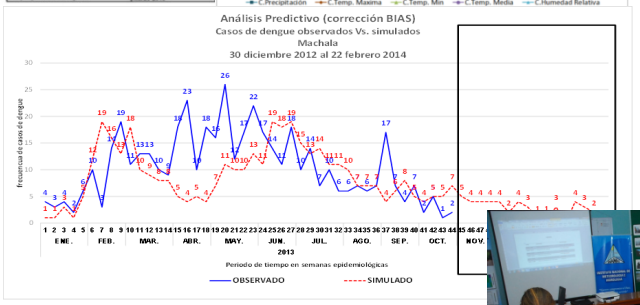
4 Decision Support Systems

Health



Prediction of Dengue





Agriculture

Predicting Agricultural Pests

Banana Republic

Sugar Cane

Developing Projects

4 Decision Support Systems

Malaria risk in Coastal Ecuador

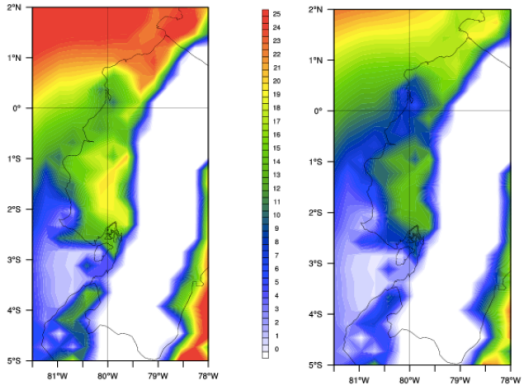


Figure 8. January *Plasmodium vivax* (left panel) and *P. falciparum* (right panel) basic reproductive rates on the Ecuadorian coast, simulated for the period 1996-2008 and for *Anopheles albimanus* mosquito species. (After Muñoz and Recalde [24]).

Air pollution risk in Lima, Perú

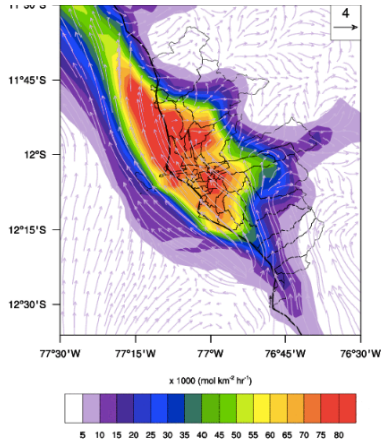
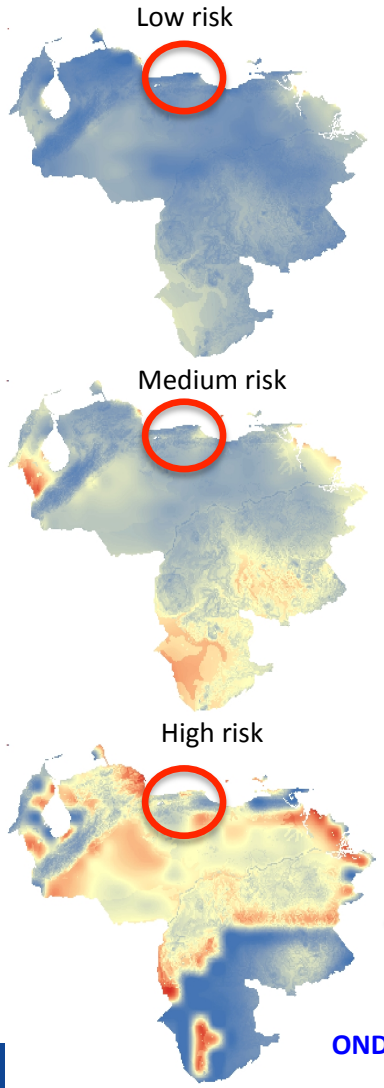
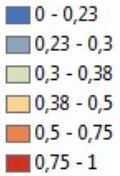


Figure 9. 4-km spatial resolution hindcast WRF-Chem model simulation outputs of NOx concentration fluxes in the geographic domain 12°30′S – 11°30′S and 76°30′W – 77°30′W. Typical NOx concentration fluxes are expressed in thousand mol/km²/hr. The reference arrow represents wind speeds of 4 m/s.

Flood risk categories



Hindcast for Vargas State, Venezuela (1999)



Flood risk probability

More info: Muñoz *et al.*, 2012

Conclusions

- Observation network is important, and a greater coverture could be achieved adding relatively economic stations, but also **merging local data with satellite observations** (e.g. IRI's ENACTS in Africa).

- **Monitoring** is essential, but users rarely require raw data; **context** for predictions must be presented as clear information about the recent past and present. **Early Warning Systems**.

- Users require **sub-seasonal** information. More efforts should be oriented to develop quality products at this scale, preferably taking advantage of the stregths already present in the region (e.g. use of CPT). We require **multi-scale** climate information.

- **Decision Support Systems** must be built *with* the users, and must include information about the probability of risk, not only hazards (i.e., rainfall maps are not enough).

Secretaría de Gestión de Riesgos

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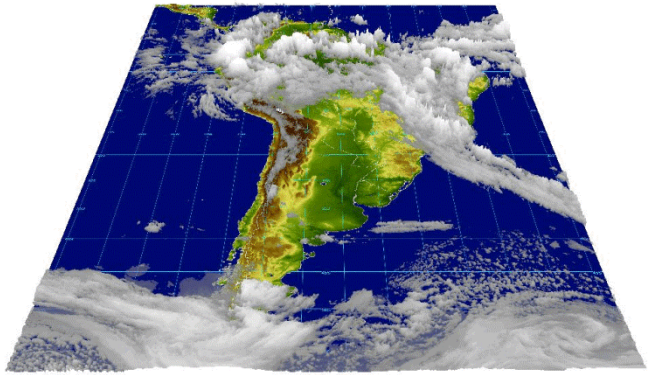
Gracias



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