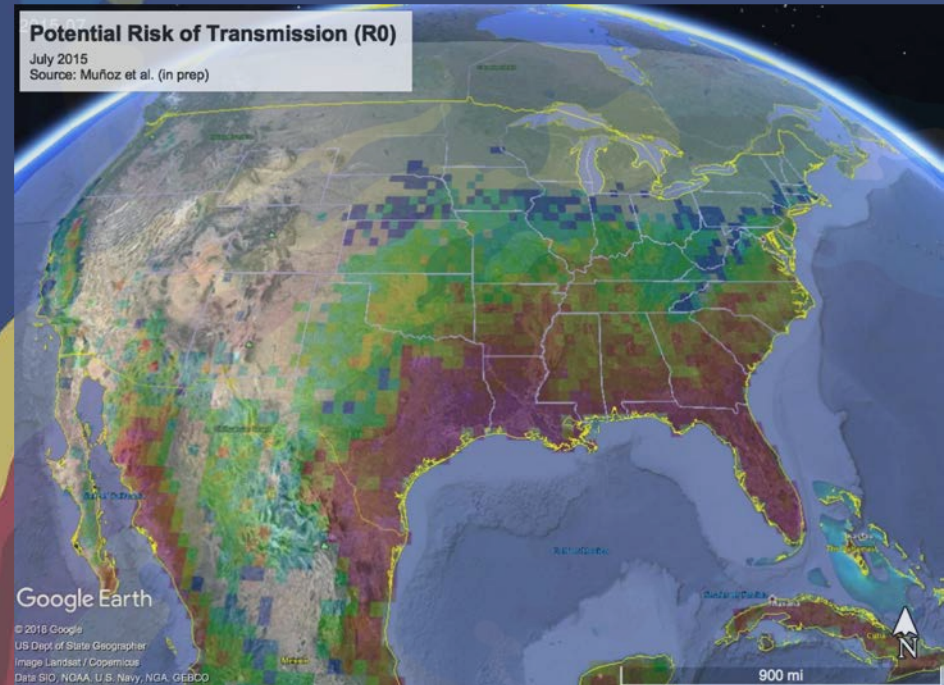


A Next-Generation Monitoring and Forecasting System for Environmental Suitability of *Aedes*-borne Disease Transmission

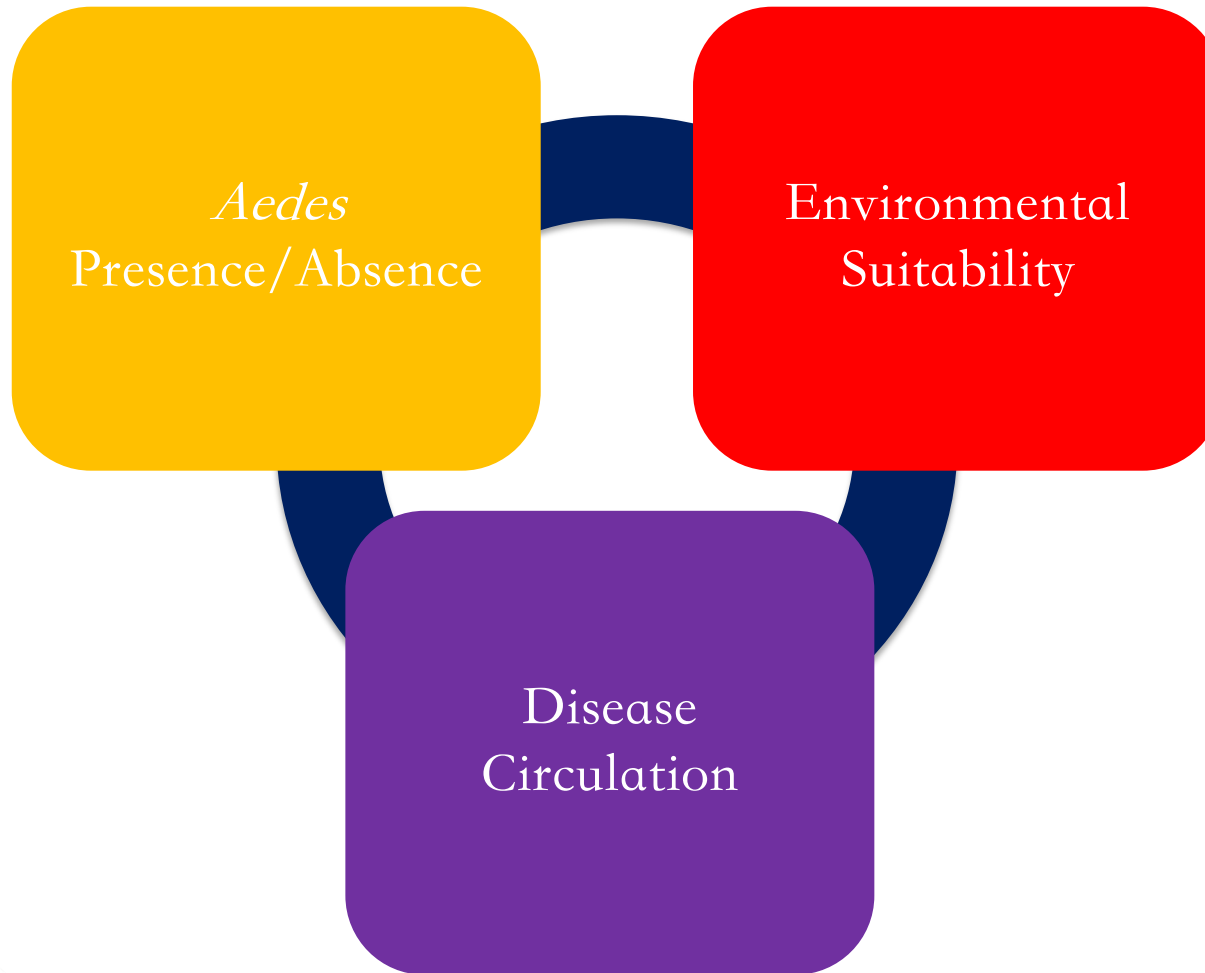
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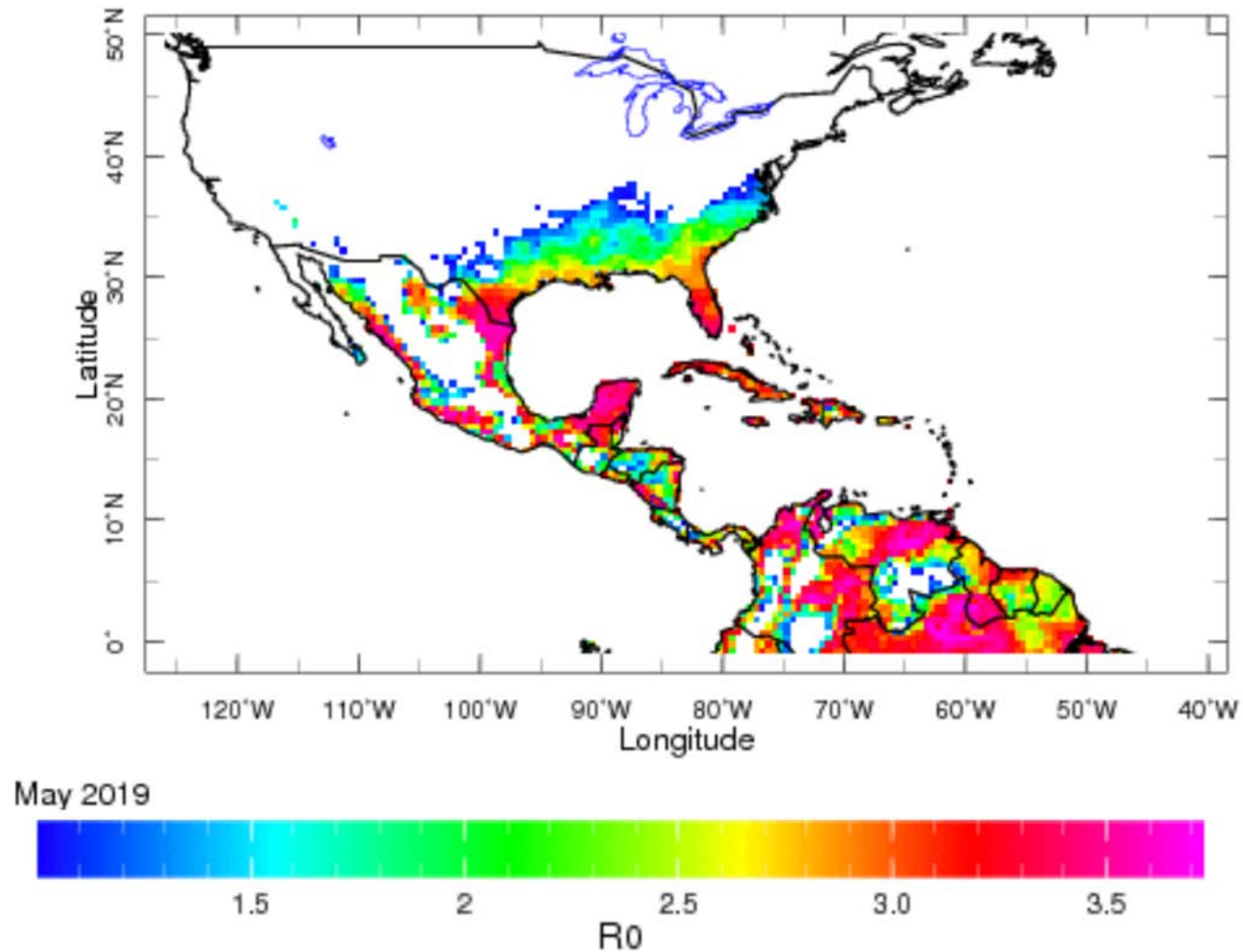


Special thanks to:
Columbia U. E3B, PAHO/WHO,
CDC, CARPHA, NOAA's IRAP2

A next-gen monitoring and forecast system of *Aedes* -borne diseases



Environmental Suitability



A multi-model monitoring and forecast system for environmental suitability of *Aedes*-borne diseases

Outcome: monitor and forecast system
for environmental suitability
(past or future)

Caminade et al

R_0 models

Wesolowski et al

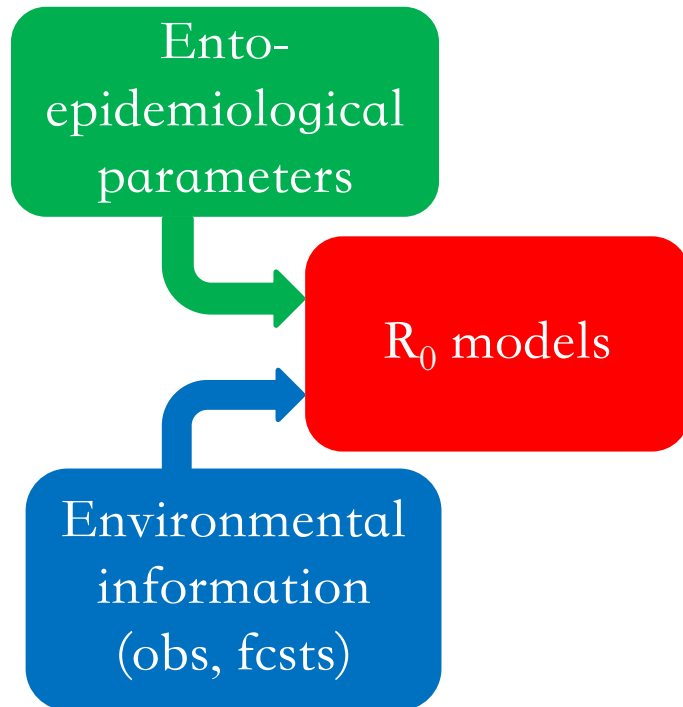
Liu-Helmersson et al

Mordecai et al

- Multiple validated basic reproduction number (R_0) models for *Aedes*-borne diseases



A multi-model monitoring and forecast system for environmental suitability of *Aedes*-borne diseases



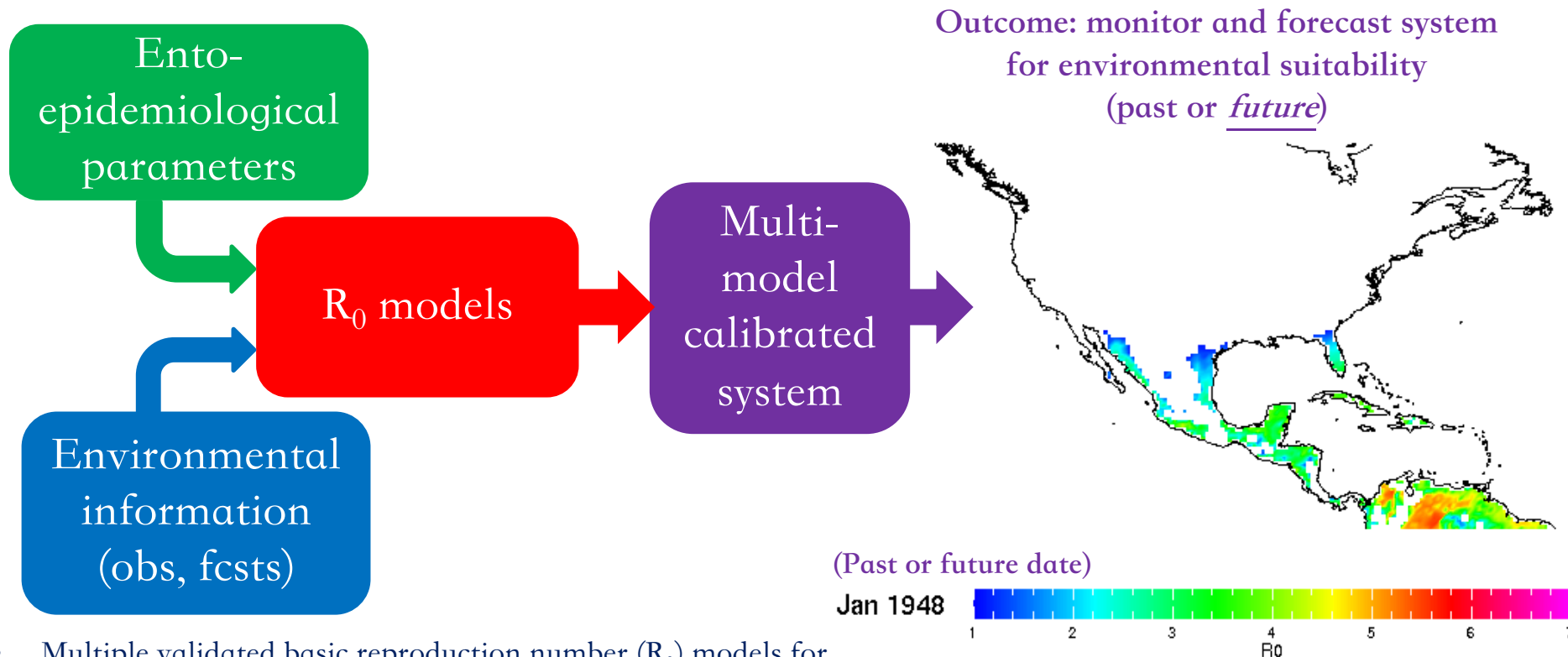
Outcome: monitor and forecast system
for environmental suitability
(past or future)

- Multiple validated basic reproduction number (R_0) models for *Aedes*-borne diseases
- System uses both ento-epidemiological parameters and climate information (observed or forecast) to estimate past, present and future (from weeks to a few months) environmental suitability.

- Seasonal *climate* forecast: NMME
- Sub-seasonal climate forecasts: S2S Database/NOAA's SubX

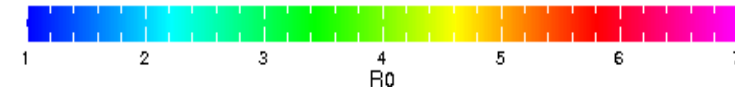


A multi-model monitoring and forecast system for environmental suitability of *Aedes*-borne diseases



(Past or future date)

Jan 1948

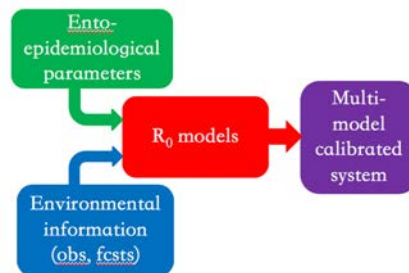


Environmental suitability (R_0) for *Aedes*-borne diseases.
[Muñoz et al., 2016, 2017a,b, 2018]

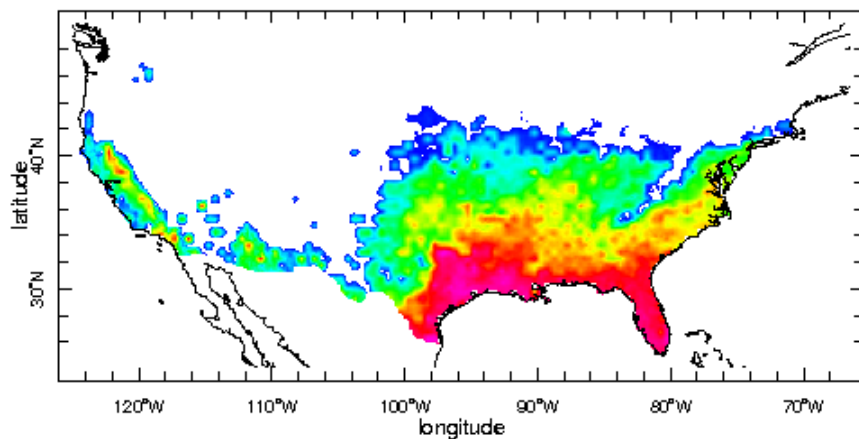
- Multiple validated basic reproduction number (R_0) models for *Aedes*-borne diseases
- System uses both ento-epidemiological parameters and climate information (observed or forecast) to estimate past, present and future (from weeks to a few months) environmental suitability.
- Systematically combined in a calibrated multi-model ensemble.

- Seasonal *climate* forecast: NMME
- Sub-seasonal climate forecasts: S2S Database/NOAA's SubX

Observations: Monitoring System

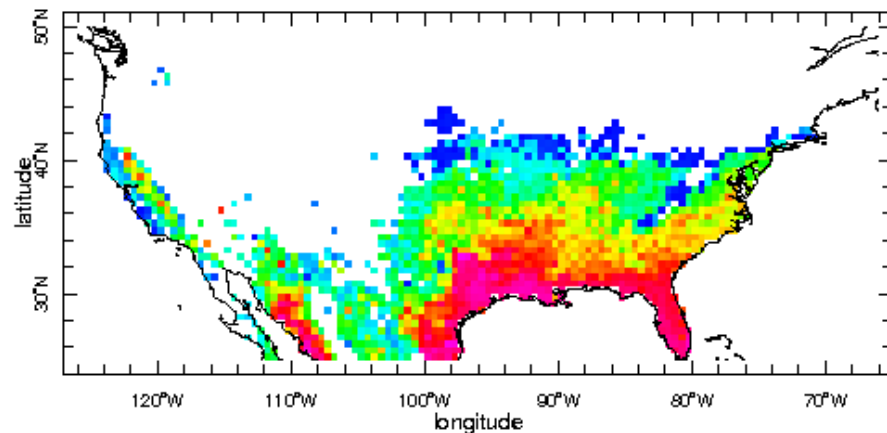


R0 model (PRISM)

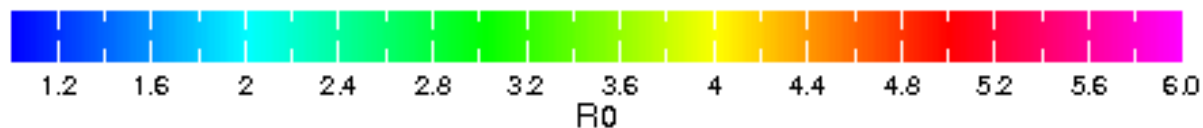


Aug 1998

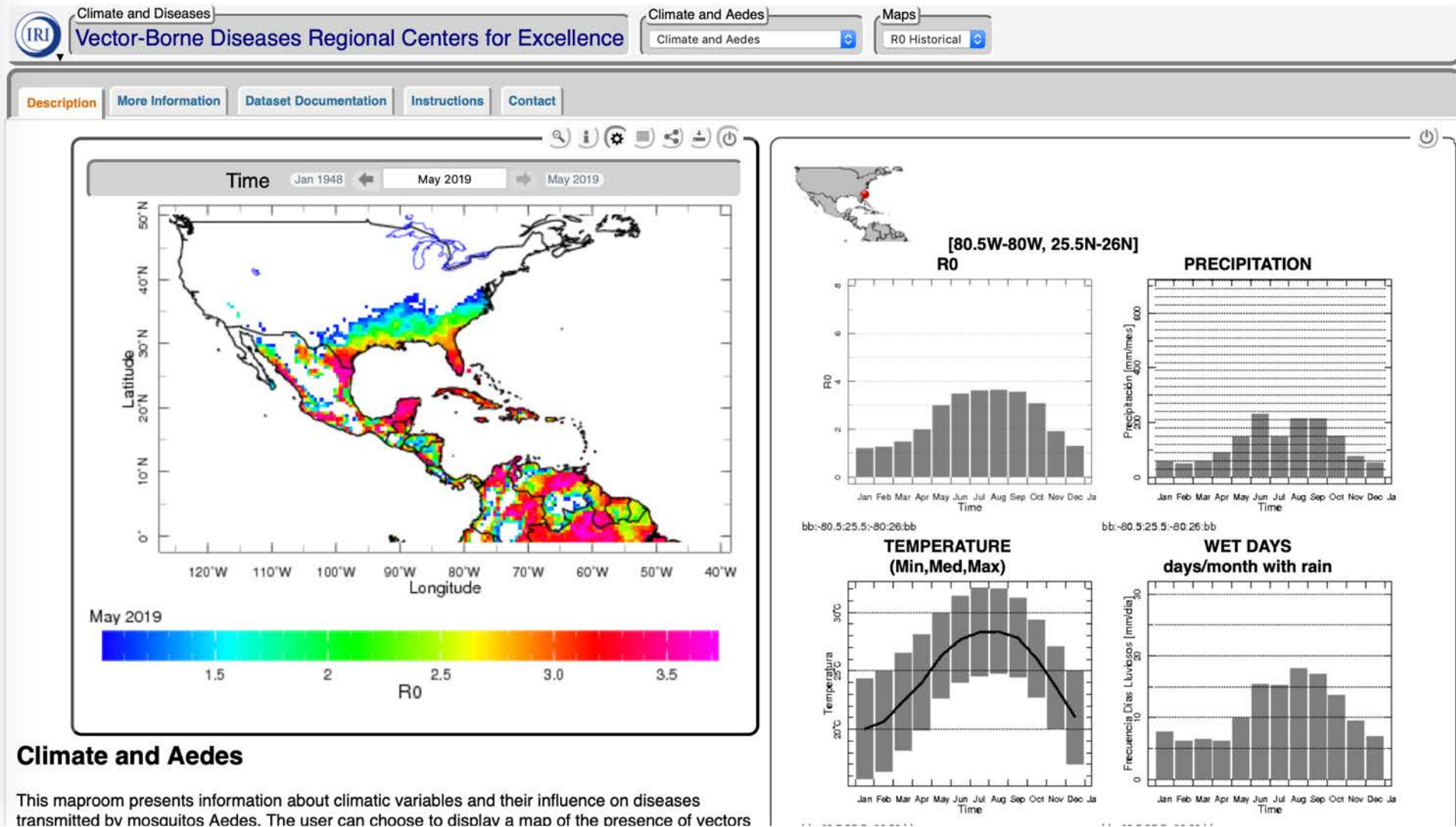
R0 model (CRUv4)



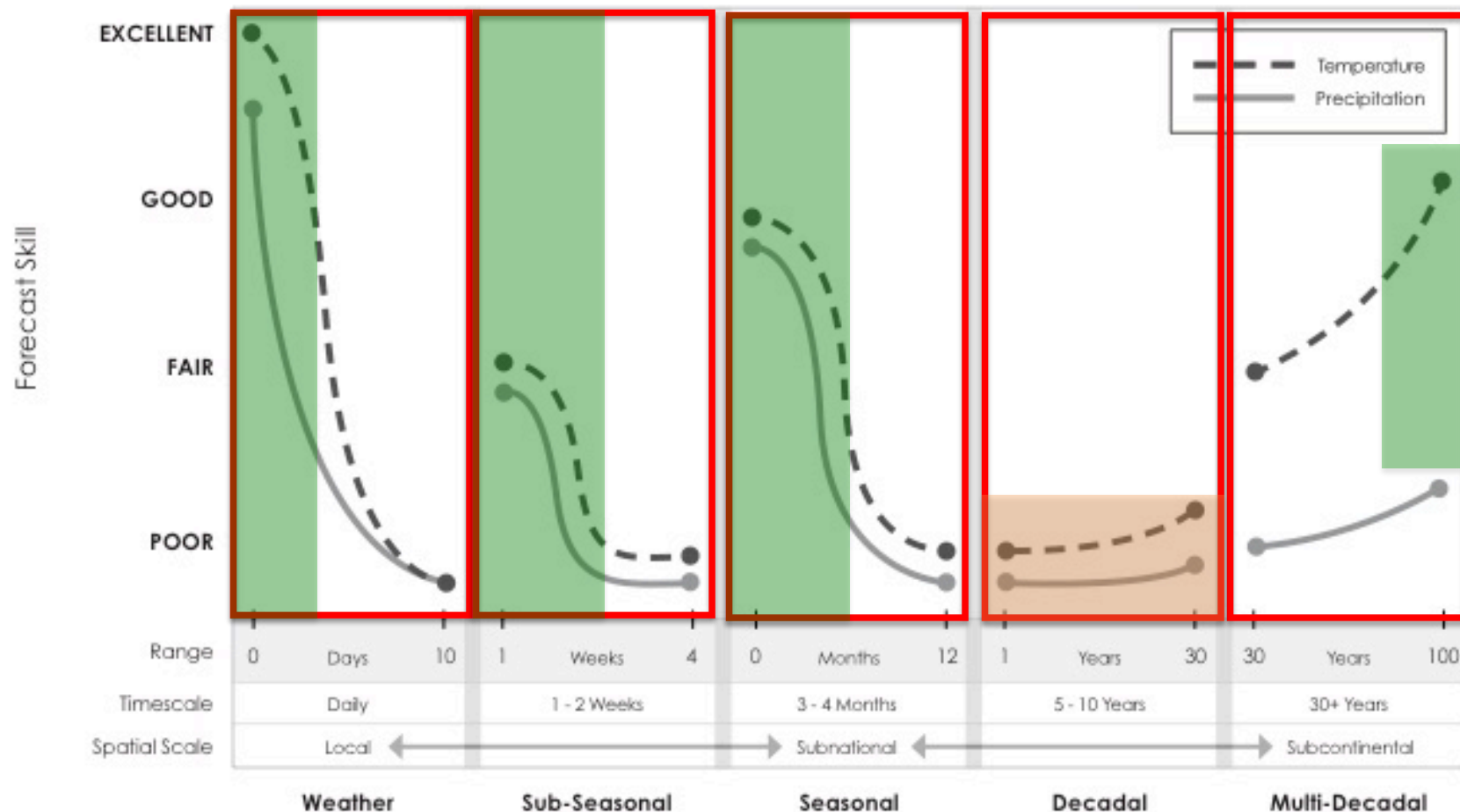
Aug 1998



Observations: Monitoring System

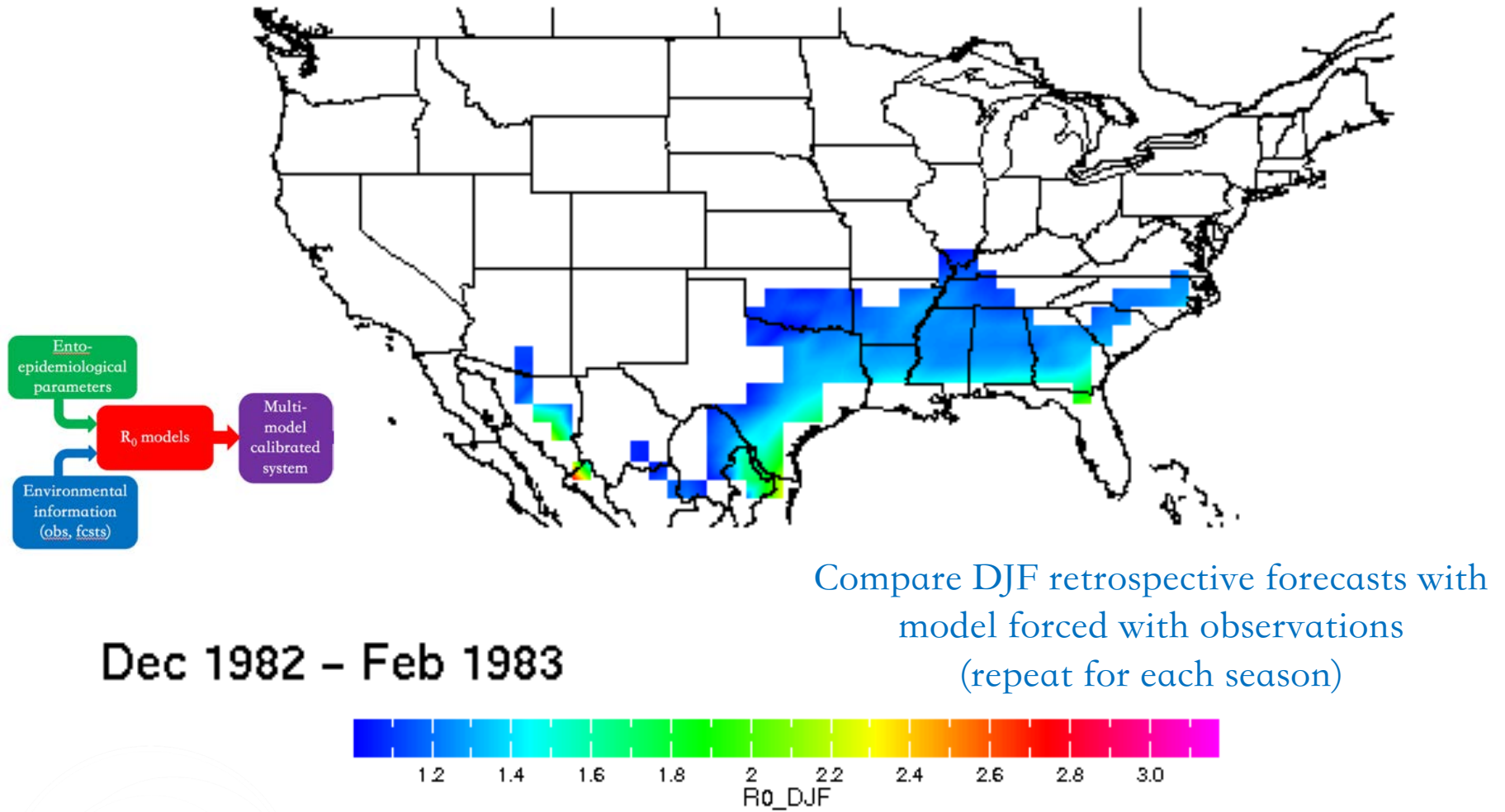


Predictive skill depends on space and time scales



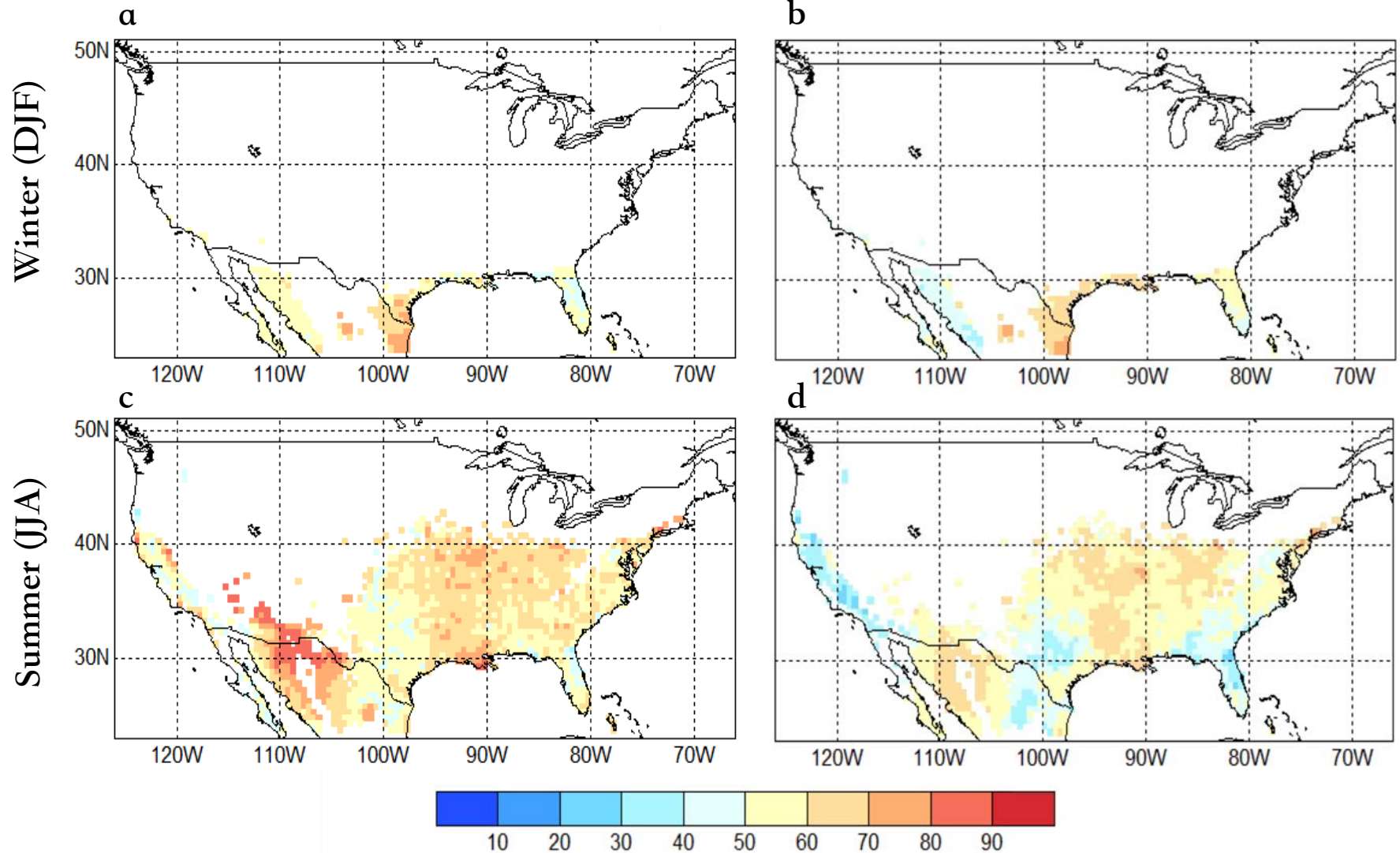
1. Thomson MC, et al. (2018). Chapter 3. Connecting Climate with health outcomes. Thomson MC, S.J. M, eds. Climate Information for Public Health Action. London UK: Routledge.

How do we assess skill?



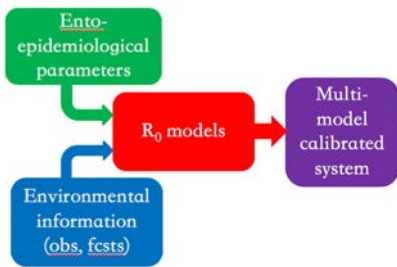
Multi-model

One model

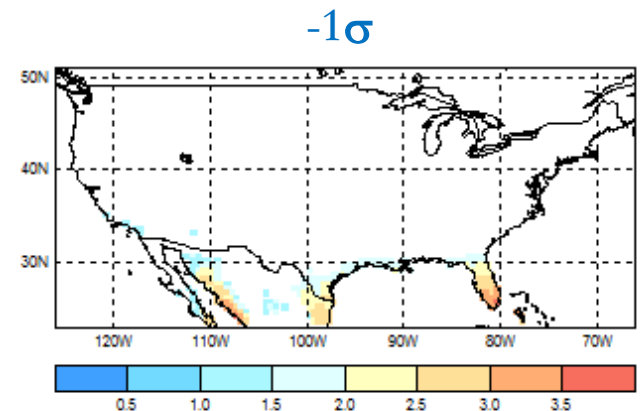
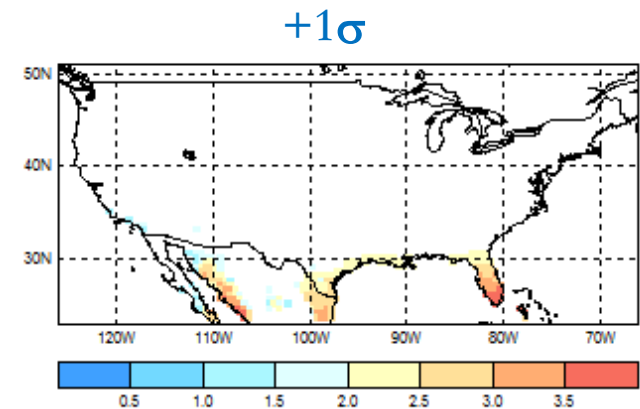
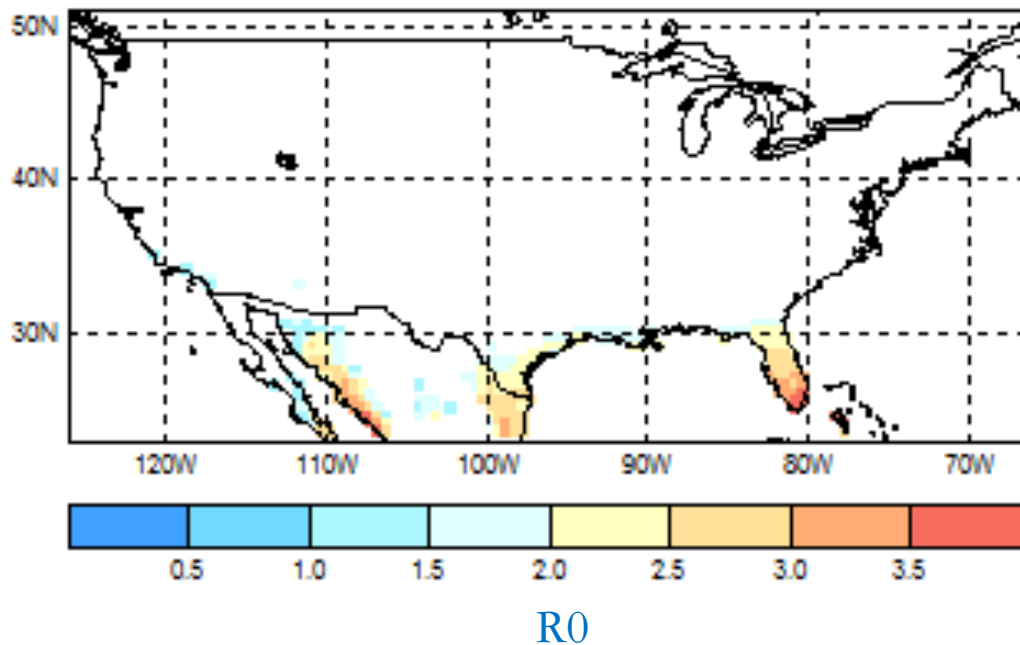


2AFC (categorical)
-Assess discrimination-

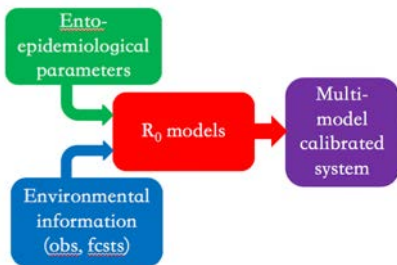
Realtime Deterministic Forecasts



DJF 2018-2019 (Init. Nov 2018)

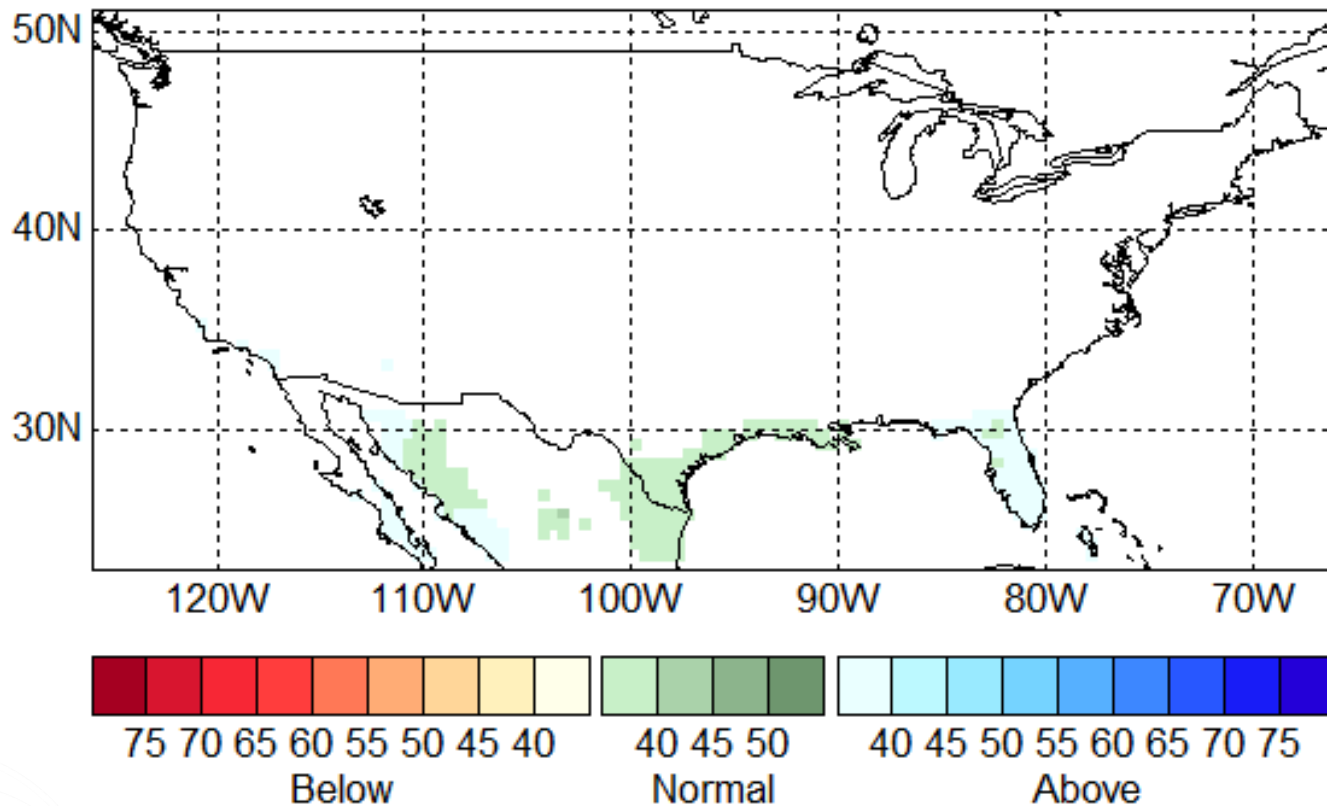


Realtime Probabilistic Forecasts



DJF 2018-2019 (Init. Nov 2018)

Forecasts *in context*



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