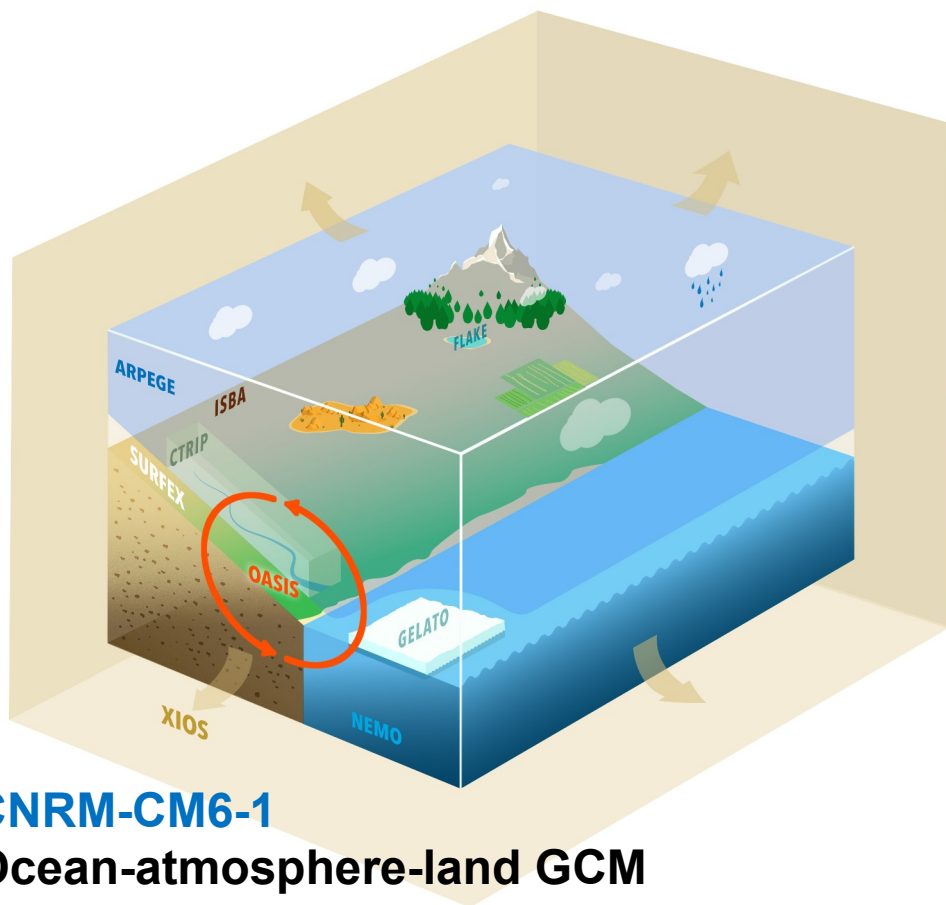# Update on WGSIP-related activities at Météo-France

Lauriane Batté (Météo-France)
24th session of WGSIP, ECMWF, Reading, UK

Seasonal prediction at Météo-France

Based on a high-resolution version of the CNRM-CM6-1 coupled climate model (Voldoire et al., 2019)

CNRM-CM6-1
Ocean-atmosphere-land GCM

Voldoire et al. (2019)

Model developed at CNRM, in collaboration with CERFACS

ARPEGE-Climat v6.4 (tl359l137r) + SURFEX / ISBA / CTRIP

1-hour coupling using OASIS MCT with NEMO v3.6 / GELATO 6 (ORCA0.25°)

Hindcast : 25 members* 1993-2018

Forecast : 51 members

Coupled initialization strategy (constraining our initialization run towards ERA5/ERA5T and GLORYS12V1 / Mercator oper. analysis)
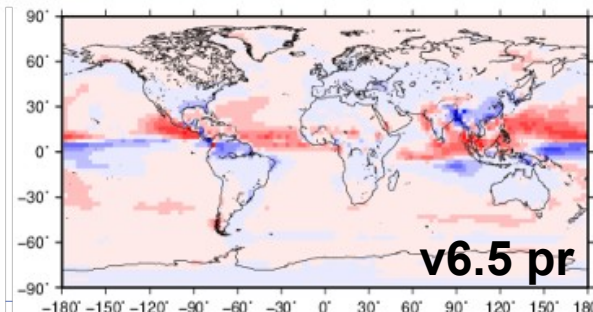
Data provided each month to the Copernicus Climate Change Service (C3S):
https://climate.copernicus.eu/seasonal-forecasts
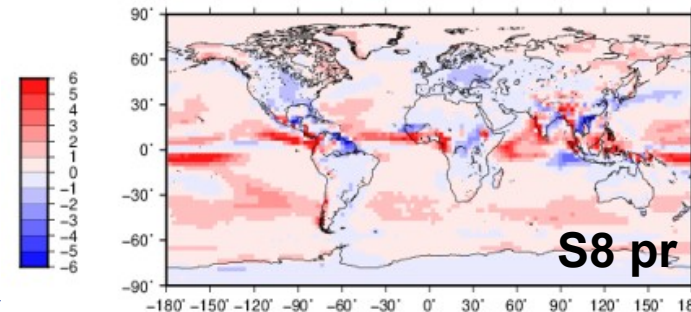
Seasonal prediction system evolution
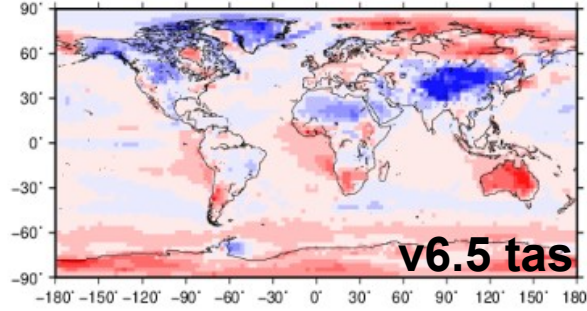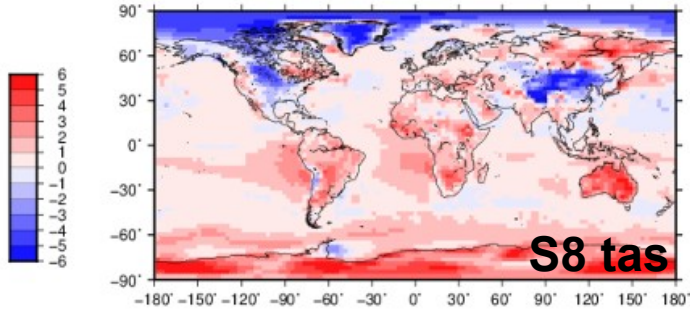
DJF bias for November start month in S8 (left) vs hindcasts with ARPEGE v6.5 (right)
←

S8 tas

v6.5 tas

S8 pr

v6.5 pr

S8 tas

v6.5 tas

S8 pr

v6.5 pr
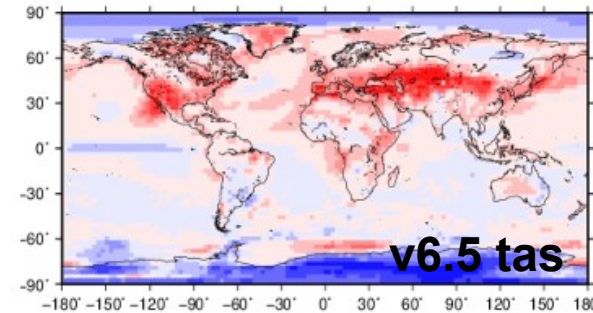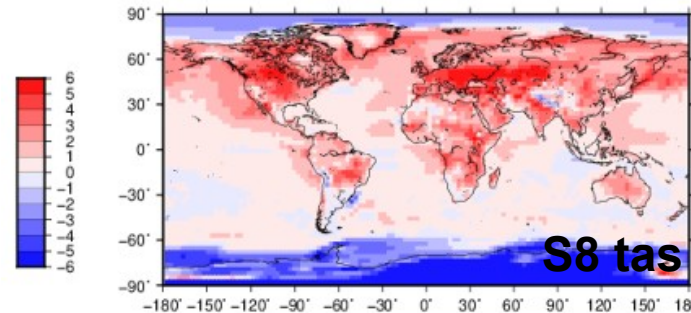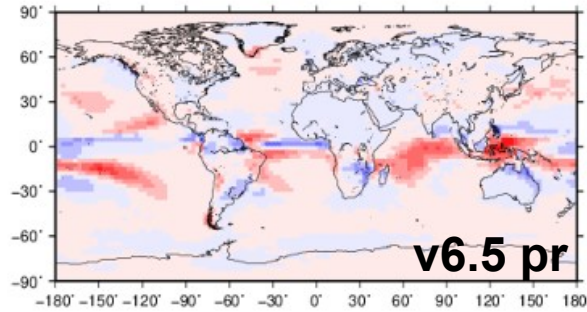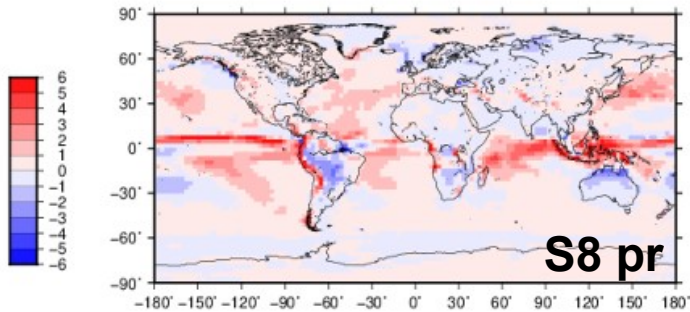
JJA bias for May start month in S8 (left) vs hindcasts with ARPEGE v6.5 (right) →
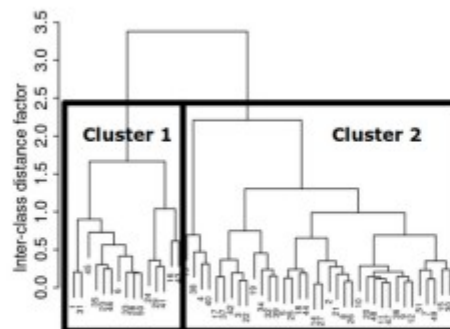
Aim: provide additional guidance in preparation of the operational forecast bulletin on possible outcomes of the upcoming season.

Method: hierarchical clustering of T2m anomalies based on dissimilarity between ensemble members (Nakaegawa and Kanamitsu, 2006)
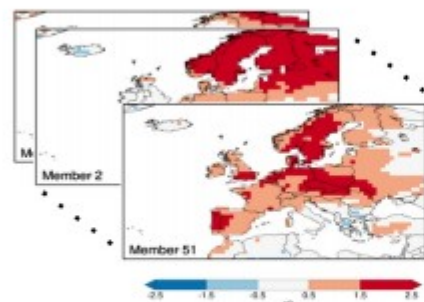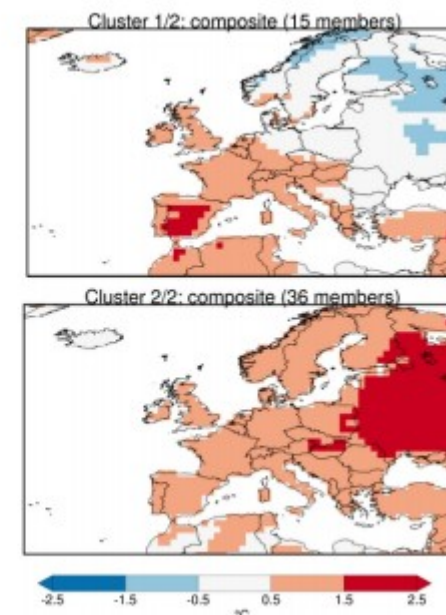

T2m AMJ 2022 anomaly maps for 51-member real-time forecast (MF system 8, issued March 2022)

Dendrogram of the 51-member clustering

Cluster 1/2: composite (15 members)

Cluster 2/2: composite (36 members)

(contact: Damien Specq, CNRM)

Ongoing experimentation of the approach with MF System 8 forecasts

A posteriori evaluation of possible improvement versus use of the full ensemble

Also: indication of uncertainty in the ensemble

T2M ACC – MF system 8 real-time forecasts – Months 1-3

Maximum improvement with best scenario

Legend:
- ACC ensemble mean (51 mbs)
- Highest ACC ('best') scenario
- Nb members 'best' scenario

Sub-seasonal prediction over the Tropics
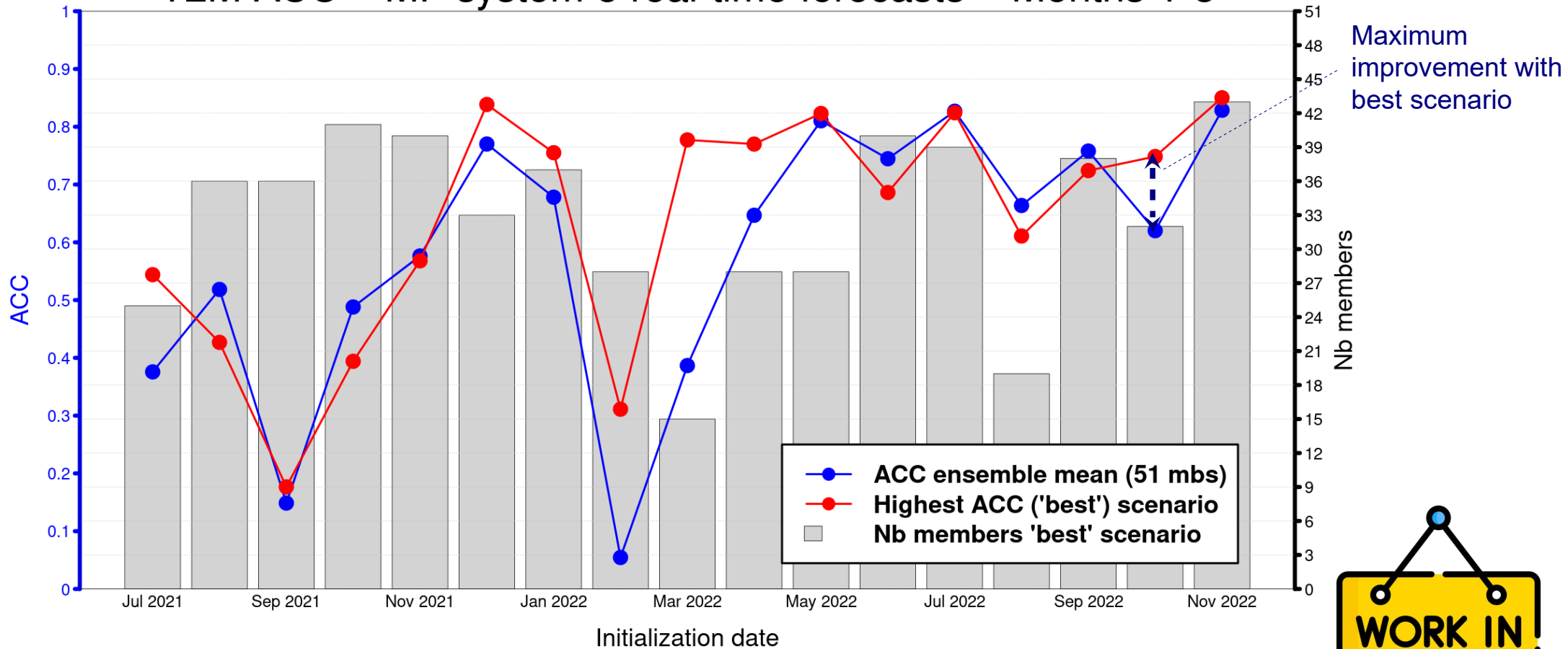
**Clustering of ECMWF S2S predictions of tropical wave propagation
(contact: Philippe Peyrillé, CNRM/LACY)**

Ensemble mean of 13 March S2S (vp200)
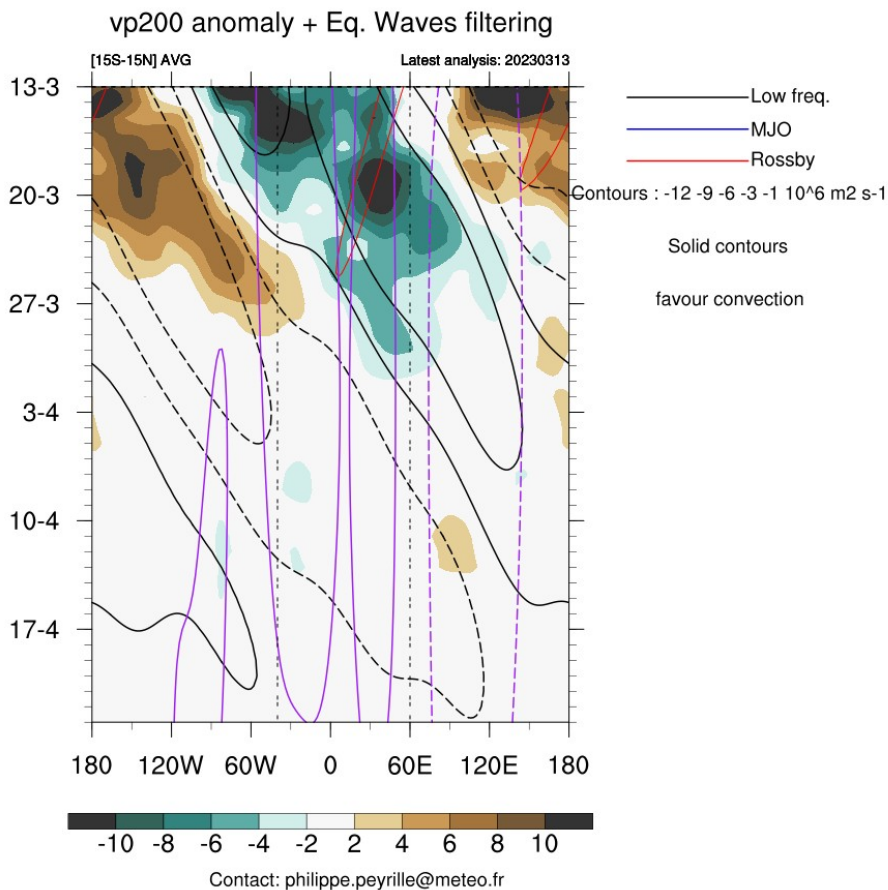
**Ensemble mean time-longitude diagrams**

- Highlight propagation of tropical wave signals (MJO *black,* equatorial Rossby waves *red,* low frequency *purple*)
- Signal is often damped after ~2 weeks

Clustering approach: classification of ensemble members
 ⇒ extract different propagation scenarios beyond week 2
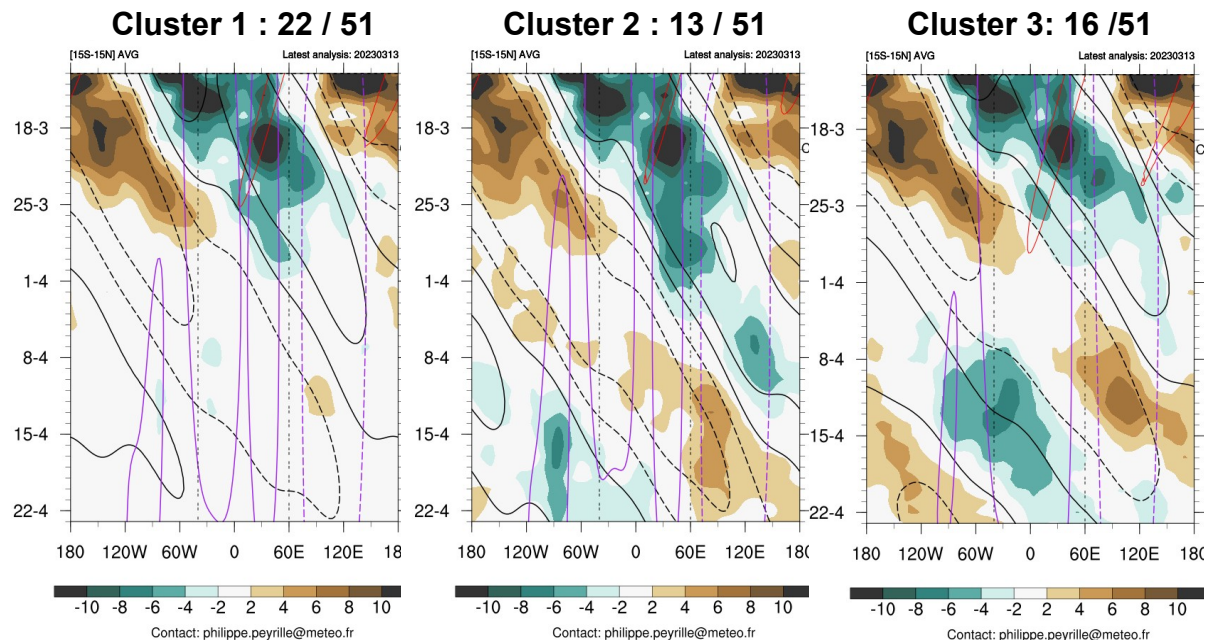
# CNRM-CERFACS S2D ESM modeling platform (TRIATLAS)

Based on the state-of-the-art Earth-system modeling platform CNRM-ESM2-1 (Seferian et al., 2019)
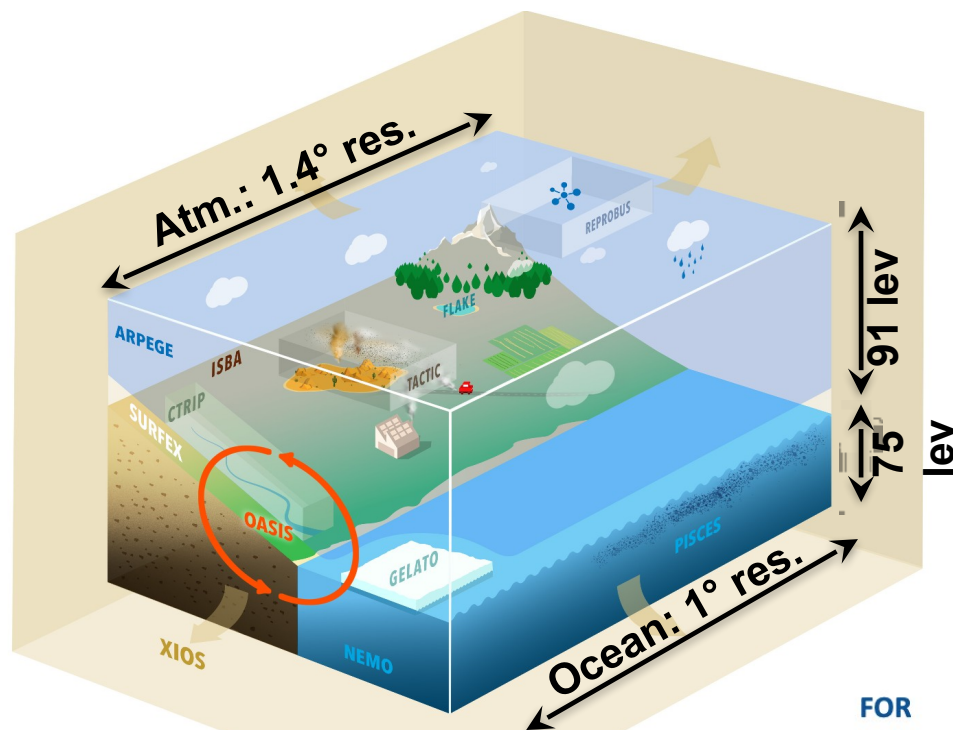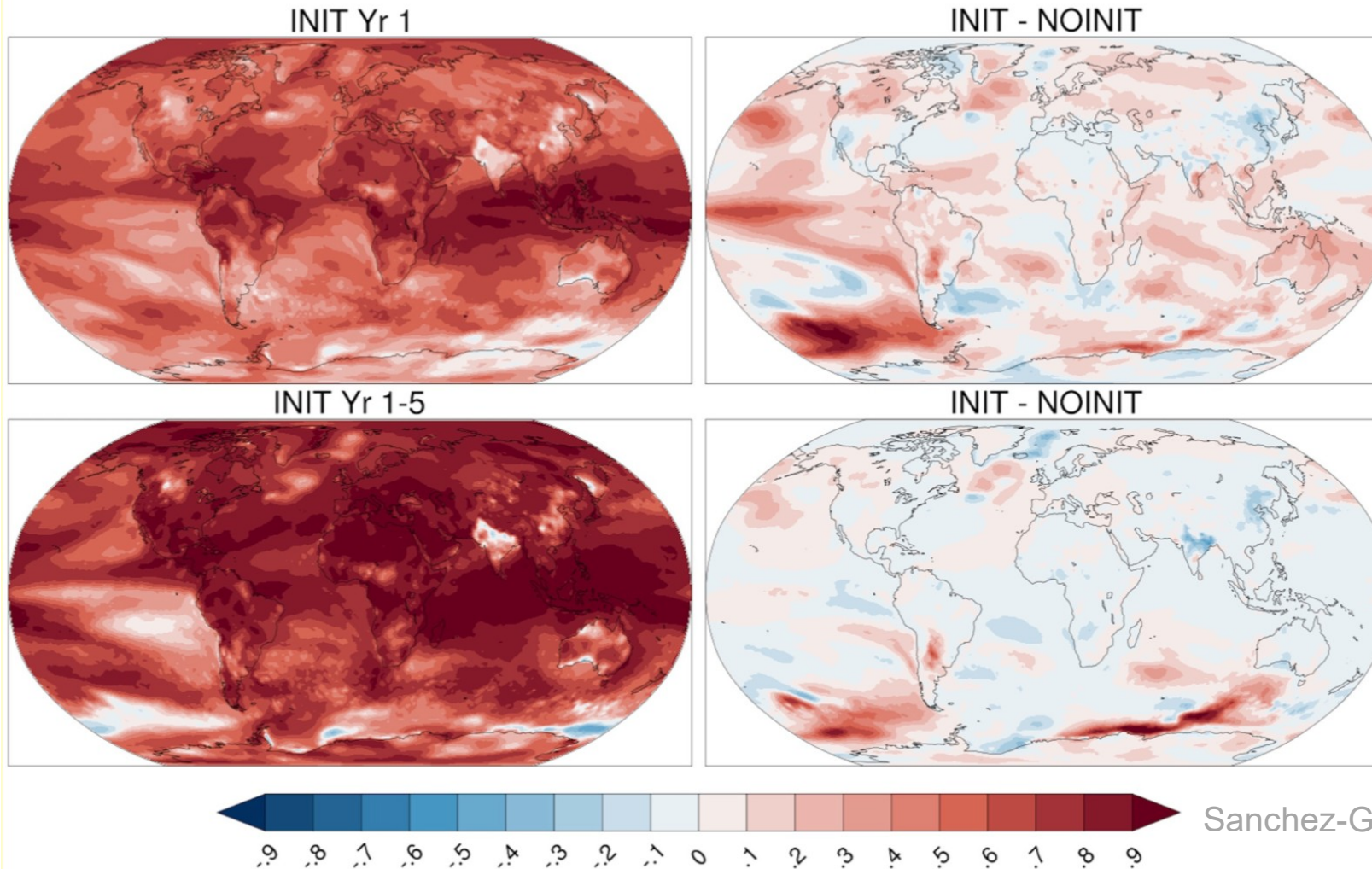

CNRM-ESM2-1
Earth system GCM
Séférian et al. (2019)

- Fully resolved ocean physics on eORCA1 grid
- Online marine biogeochemistry, aerosols, land vegetation, etc.
- Is consistent with the fully coupled version as used for CMIP6 but also for all individual components (traceable modeling platform)
- Initialization strategy building on the NEMO-PISCES ocean-only simulation for the Global Carbon Project
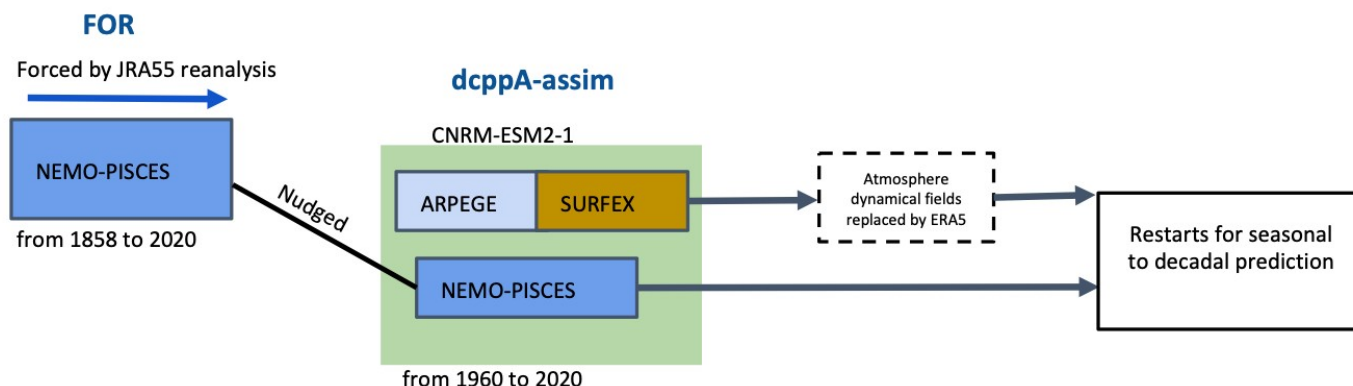
Correlation for near-surface air temperature and correlation difference with non-initialized run

Sanchez-Gomez et al. (in prep.)

Thanks for your attention!