Anomaly vs Fullfield initialized DePreSys CMIP5 simulations

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1. Introduction: Initialization Techniques

- Obs anomalies
  - + model climatology: Anomaly initialization
  - + obs climatology: Fullfield initialization
1. Introduction: DePreSys CMIP5

**Initialized** comparison: 10 transient runs (historical+RCP4.5) 1860-2035

- Anomaly Assimilation: 1 simulation 1960-2005
  - Anomaly Hindcasts: 10 x 10 (30) yrs started in 1960, 1965, …, 2005

- **Fullfield** Assimilation: 1 simulation 1960-2005
  - Fullfield Hindcasts: 10 x 10 (30) yrs started in 1960, 1965, …, 2005
2. Global mean surface air temperature

DePreSys CMIP5:

Bias corrected:

Skill:

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2. Global mean surface air temperature

Longer lead times:

anom

fullfield

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3. Temperature cor-skill first year

initialized

anom

fullfield

difference: initialized - uninitialized
3. Temperature skill difference first year

**cor-skill difference**

**rmse-skill difference**

<table>
<thead>
<tr>
<th>Region</th>
<th>Disadvantage</th>
<th>Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>anom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fullfield</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. SST cor-skill first year

initialized
difference: initialized - uninitialized

anom
colourbar

fullfield
colourbar
4. SST skill difference first year

**cor-skill difference**

- **anom**
- **fullfield**

**rmse-skill difference**

- **anom**
- **fullfield**
4. SST cor-skill years 2...5

initialized

difference: initialized - uninitialized

anom

fullfield
4. SST skill difference years 2...5

- **cor-skill difference**
- **rmse-skill difference**

The images show maps of the world with color-coded regions indicating differences in SST (Sea Surface Temperature) skill for different years. The maps are differentiated by anomaly and fullfield conditions.
4. SST cor-skill years 6…10

initialized

anom
difference: initialized - uninitialized

fullfield
4. SST skill difference years 6…10

**anom**

**cor-skill difference**

**rmse-skill difference**

**fullfield**

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4. SST cor-skill years 6…10
4. SST cor-skill years 6…10

(bias corrected)
4. SST skill difference years 6…10

Anom

Cor-skill difference

Bias corrected

RMSE-skill difference

Fullfield
7. HC (400m) skill difference years 6…10

**anom**

- **cor-skill difference**
- **rmse-skill difference**

**fullfield**

- **cor-skill difference**
- **rmse-skill difference**

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5. AMOC in assimilation run

mean 1960-2005

anom

fullfield

correlation
6. Why is there no advantage in the North Atlantic?

mm/day

% of climatology

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Conclusions

- In the first years similar advantages from anomaly vs fullfield initialization
- Differences evolve after some years
- Limited number of start dates is causing misleading results

Cor-skill difference DePreSys PPE (first year)
3. Temperature cor-skill first year

initialized

uninitialized

difference

anom

fullfield
6. Temp cor-skill first year (2000s filled up)

initialized

uninitialized

difference

anom: 10 start dates

anom: 18 start dates