

# Recommendations of the Decadal Climate Prediction Project for bias correction of decadal hindcasts

J. Grieger<sup>1</sup>, Doug Smith<sup>2</sup>, George Boer<sup>3</sup>

and the Bias adjustment breakout group of the Workshop on Initial Shock, Drift, and Bias Adjustment in Climate Prediction, 10-11 May 2016, Barcelona, Spain  
(Doug Smith, Virginie Guemas, Holger Pohlmann, George Boer, Wolfgang Mueller, Anca Brookshaw, Mark Liniger, Tina Deppe, Barbara Fruh, Ramiro Saurral, Frank Sienz, Jens Grieger, Neven Fuckar, Wilco Hazeleger)

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  - ▶ in conjunction with the Working Group on Seasonal to Interannual Prediction (WGSIP) and the Working Group on Coupled Modelling (WGCM)
  - ▶ in the framework of the World Climate Research Programme (WCRP)
- "decadal" corresponds to annual, multi-annual and decadal timescales

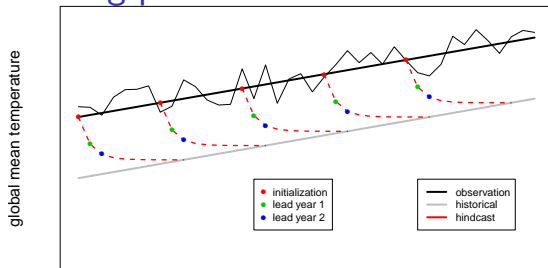
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- experiment design for decadal predictions for CMIP6
  - ▶ hindcast experiments
  - ▶ near term forecasts
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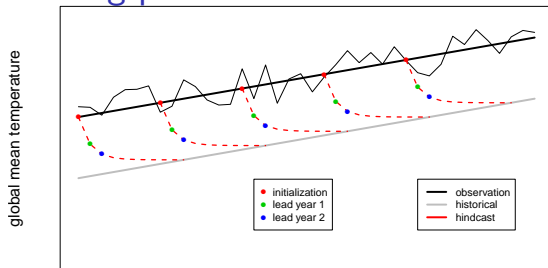
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- Model experiment description paper of the Decadal Climate Prediction Panel [**Boer et al., 2016**]
  - ▶ recommendations for bias correction in **Appendix E**

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- random data
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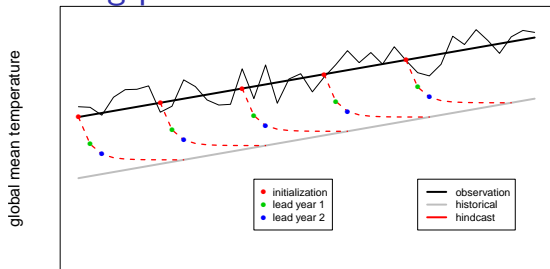
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CMIP5 bias correction guidance (for full-field initialization) [ICPO, 2011]

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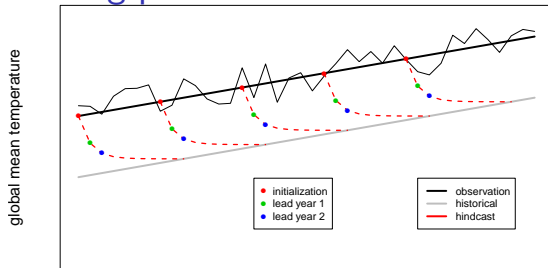
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## CMIP5 bias correction guidance (anomaly initialization) [ICPO, 2011]

$b = \langle Y \rangle - \langle X \rangle$  : no dependency on  $\tau$  assumed  $\rightarrow$  Problem: initialization shock



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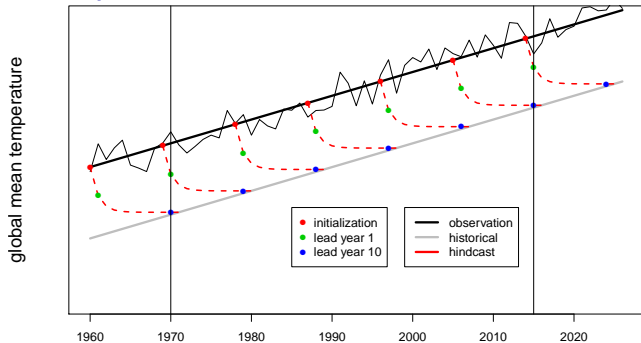
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$\{\bar{Y}\}_\tau = 1/n \sum_{j=\text{year1}}^{\text{year2}} \{Y\}_{j\tau}$  ;  $\{\}$  : mean of ensemble members  $k$

forecast anomaly:  $Y'_{kj\tau} = Y_{kj\tau} - \{\bar{Y}\}_\tau$

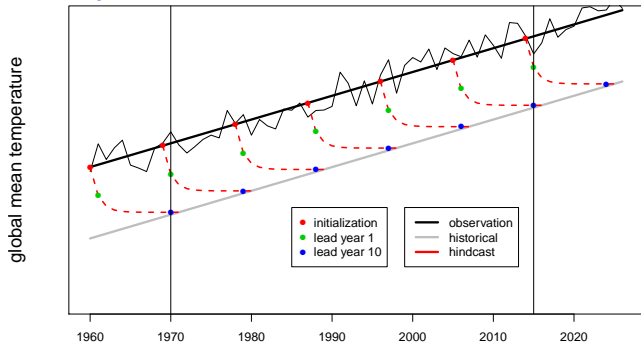
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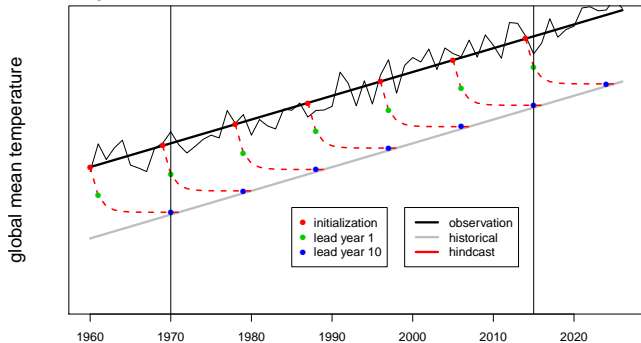
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- for CMIP6: year1=1970, year2=2016

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- differences in simulated and observed trends lead to a bias dependency on the initialization time
- this is not taken into account by the mean bias correction described so far
- the best way to take this into account, especially for regional predictions, is still an open question
- several methods could be considered [Kharin et al., 2012, Fučkar et al., 2014, Kruschke et al., 2015]

## Find more details...

G. J. Boer, D. M. Smith, C. Cassou, F. Doblas-Reyes, G. Danabasoglu, B. Kirtman, Y. Kushnir, M. Kimoto, G. A. Meehl, R. Msadek, W. A. Mueller, K. Taylor, and F. Zwiers. The decadal climate prediction project. *Geoscientific Model Development Discussions*, 2016:1–32, 2016. doi: 10.5194/gmd-2016-78

- Appendix E

## Find more details...

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Thank you

# References

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- Tim Kruschke, Henning W. Rust, Christopher Kadow, Wolfgang A. Müller, Holger Pohlmann, Gregor C. Leckebusch, and Uwe Ulbrich. Probabilistic evaluation of decadal prediction skill regarding northern hemisphere winter storms. *Meteorologische Zeitschrift*, pages –, 01 2015. URL <http://dx.doi.org/10.1127/metz/2015/0641>.