

Comparative Predictability of Eastern and Western North Pacific Blocking Events

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(EGU General Assembly





Bridging Idealized Models and Real-world Scenarios



Source : Xavier et al., 2024







Bridging Idealized Models and Real-world Scenarios



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Detection and Classification of North Pacific Blocks

• Dataset used for the detection of North Pacific blocks

The historical simulation of geopotential height at 500 hPa is obtained from CMIP6 MIROC6 experiments.











Detection and Classification of North Pacific Blocks

• Dataset used for the detection of North Pacific blocks

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• Classify Eastern and Western Blocks Classification was based on Davini et al., (2012) index



(b) Western block



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Calculated Predictability using Reference-analogue Pair by **Tracking their Trajectory**

Reference Block





Analogue Block





Anomaly between reference and analogue blocks









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Calculated Predictability using Reference-analogue Pair by **Tracking their Trajectory**



Blocks are tracked using 'Block Tracking Algorithm'



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Distinct Error Evolution Patterns between Eastern and Western Blocks Reveal Contrasting Dynamics



Mean Logarithmic Growth Rate - First 50 cases



Bootstrap mean with 95% CI - First 50 cases



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Distinct Error Evolution Patterns between Eastern and Western Blocks Reveal Contrasting Dynamics



Mean Logarithmic Growth Rate - First 75 cases

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Bootstrap mean with 95% CI - First 75 cases



Morphology Plays a vital role in the Dynamics of **Atmospheric Blocking**

- Unstable eastern blocks compared to western Blocks due to the proximity of topographical features
- Low order idealized approach is really useful to identify these kind of intrinsic dynamics in the atmosphere

Future works

Investigate methods to improve initial condition estimates on the predictability and skill of Eastern and western blocking dynamics in Numerical weather prediction models



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'Predictability of north Pacific blocking events : Analogue based analysis of historical MIROC6 simulations'

in journal 'Quarterly journal of Royal Meteorological Society' Xavier, A. K., Hamilton, O., Faranda, D. and Vannitsem, S. <u>https://doi.org/10.48550/arXiv.2504.17691</u>



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Thank you very much for your attention !





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