Surface-driven categorisation of extreme wind events in convection-permitting models: Implications for wind energy planning in Central Europe.

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Adapted design from Fatih Kaya-
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Supplementary Material

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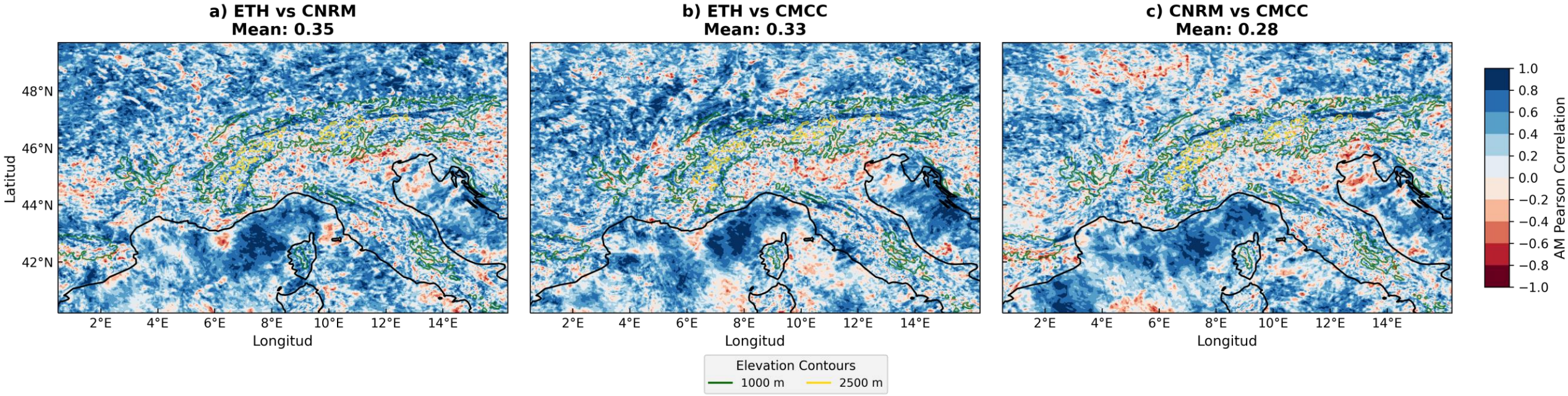
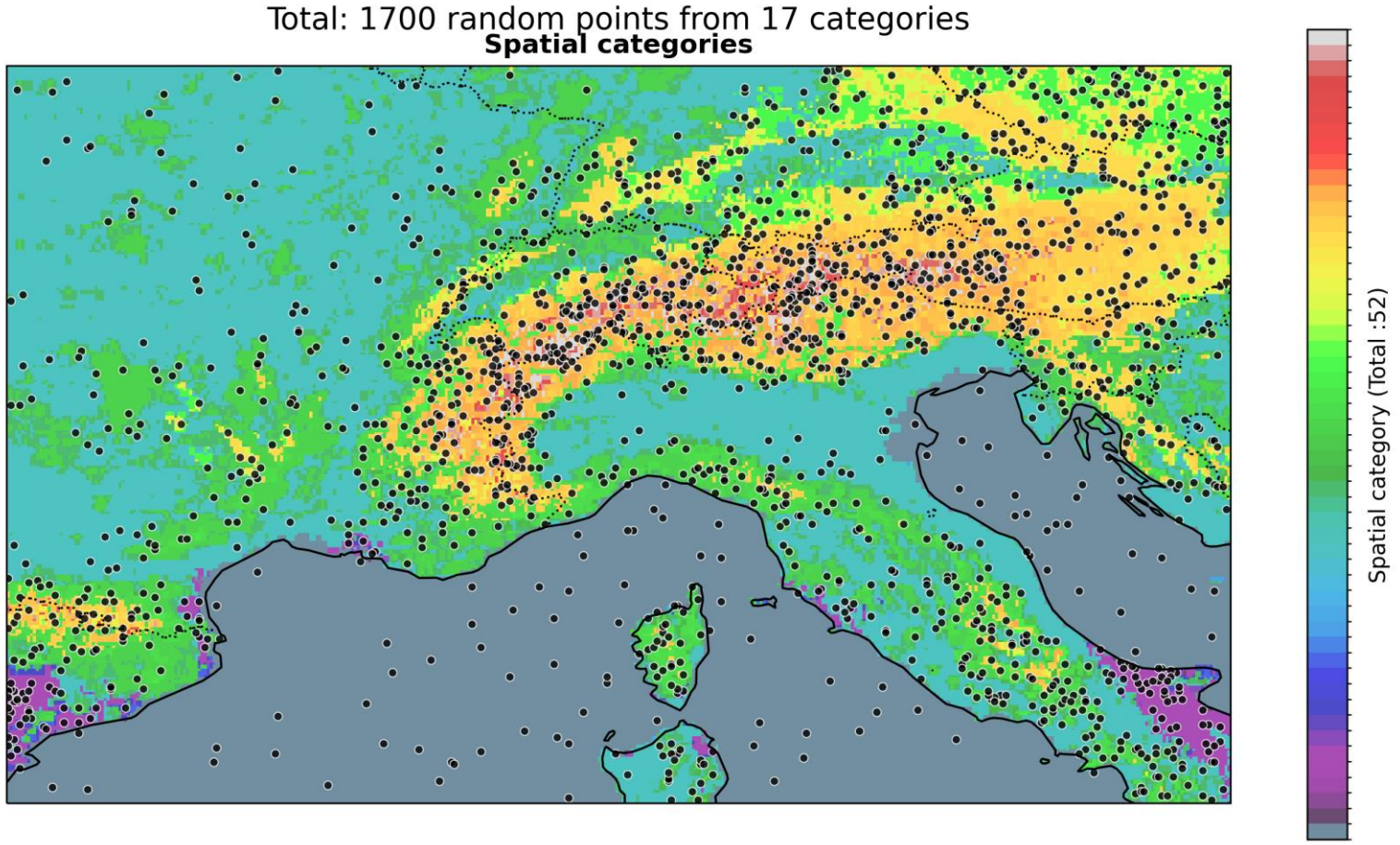
1) CPM data exploration and processing

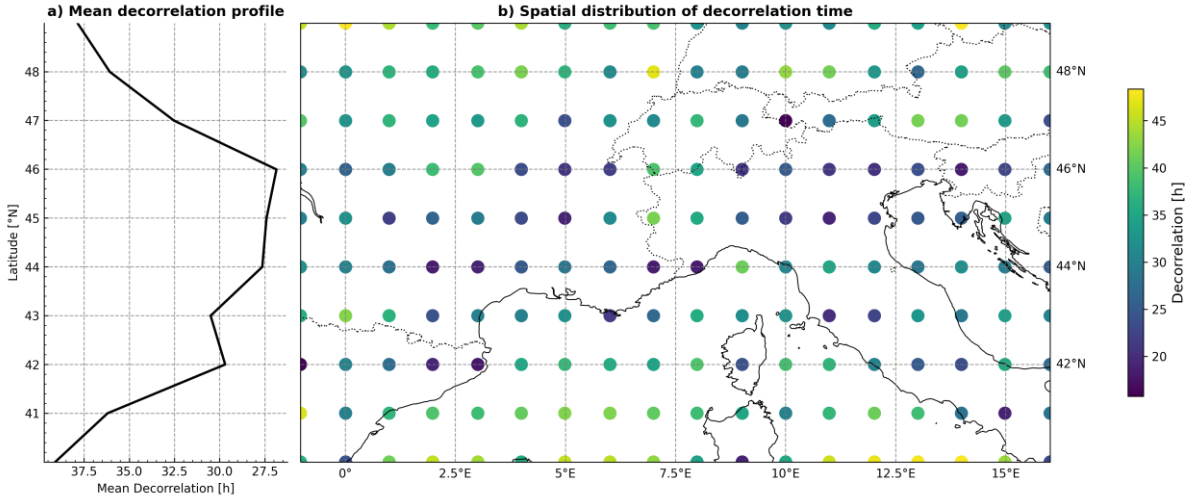


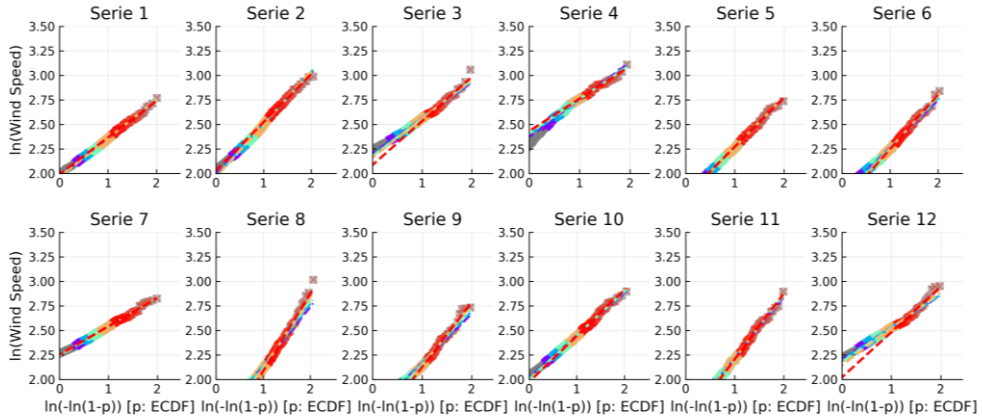
- **Spatial heterogeneity over land** may be due to how CPMs explicitly resolve small-scale convective processes having different responses to terrain features.
- **Sea areas reflect most of the agreement values:** Thermodynamic stability and a more homogeneous surface that reduces variability in how different models parameterise surface-atmosphere interactions.
- **Mountanious regions reflect low to –negative correlations**: Channelisation, orographic blocking, and slope winds are likely to be represented differently in each model→ Natural variability.

3) Stratified random sampling per spatial category



5) Extreme wind speed estimations – SMEV setting

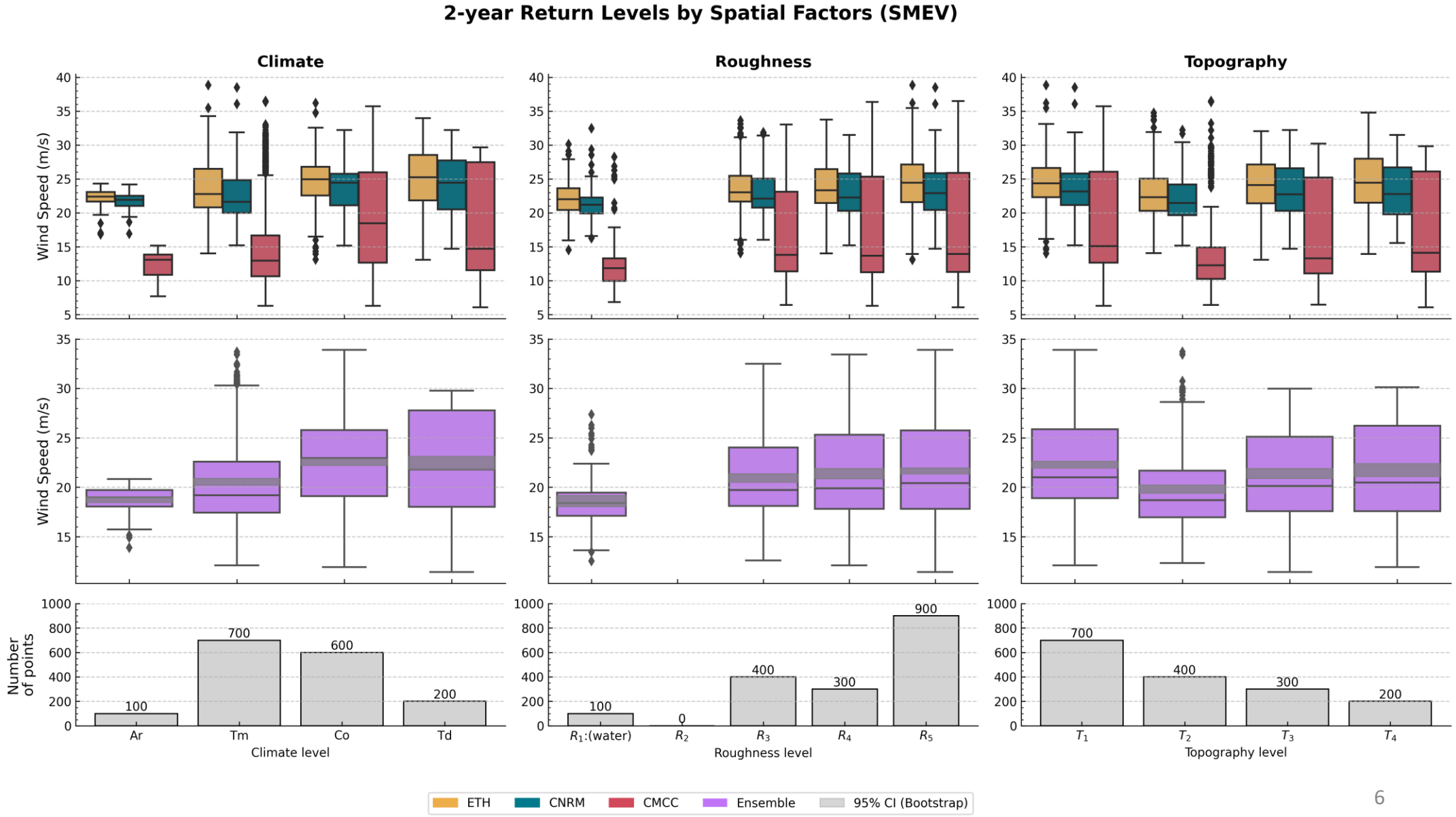




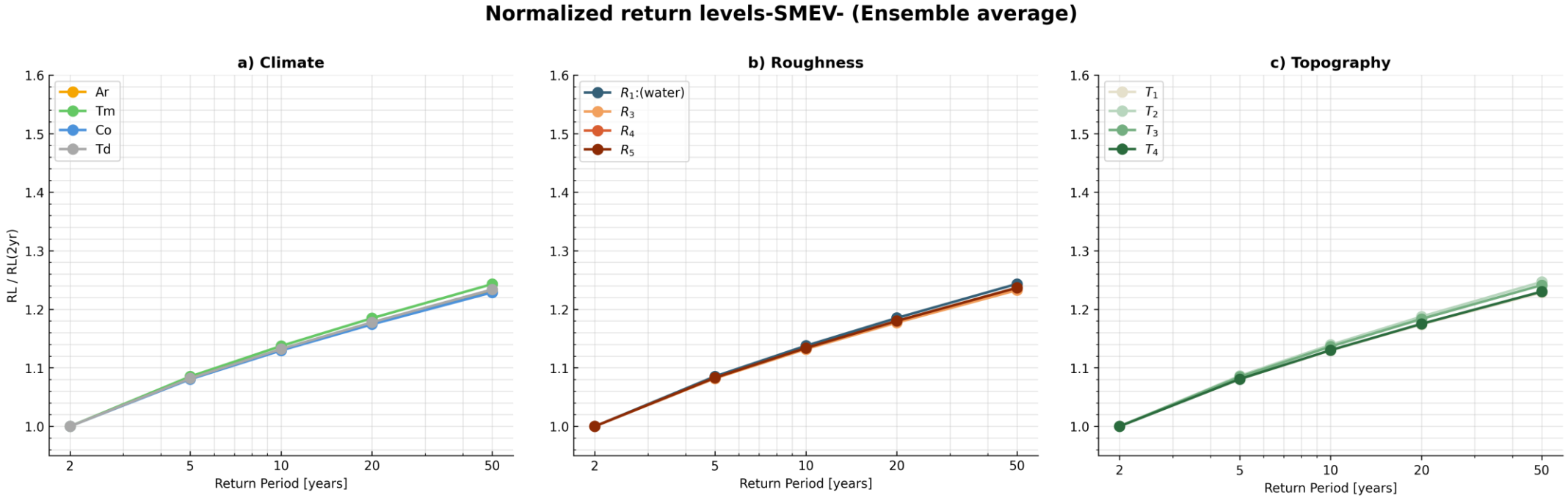
Separation of events follows a potential decorrelation (integral approach) at each point.

TOP 10% of the ordinary events

5) Extreme wind speed estimations

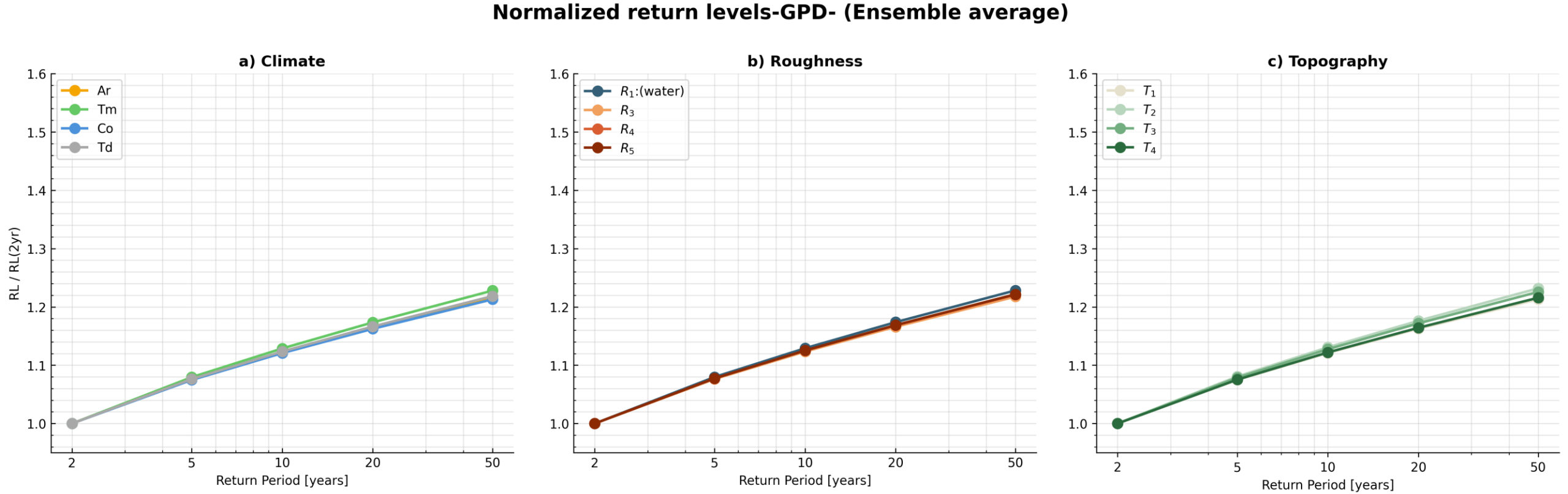


5) Extreme wind speed estimations



- High similarity between categories and consistent growth.
- The spatial resolution of the CPMs is still insufficient to represent local effects that dominate the extreme winds at 100m ? (up to which extent ?)
- Statistical homogeneity: All points, regardless of categories, follow similar statistical distributions for extreme values(??).

5) Extreme wind speed estimations



5) Extreme wind speed estimations