

Ungewöhnliches Beet

Wassermelonen und Tomaten wachsen am Ufer von Rhein und Sieg

4. September 2022 um 12:28 Uhr | Lesedauer: 2 Minuten

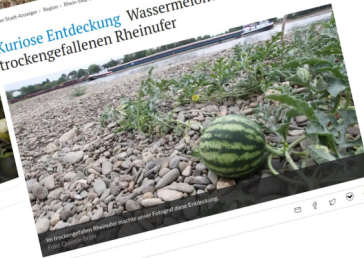


Klimawandel bringt wärmeliebende Pflanzen an den Rhein
Melonen und Feigen Klimawandel bringt wärmeliebende Pflanzen an den Rhein



02.09.2022 12:28 Uhr

Kuriose Entdeckung Wassermelonen wachsen am trockengefallenen Rheinufer

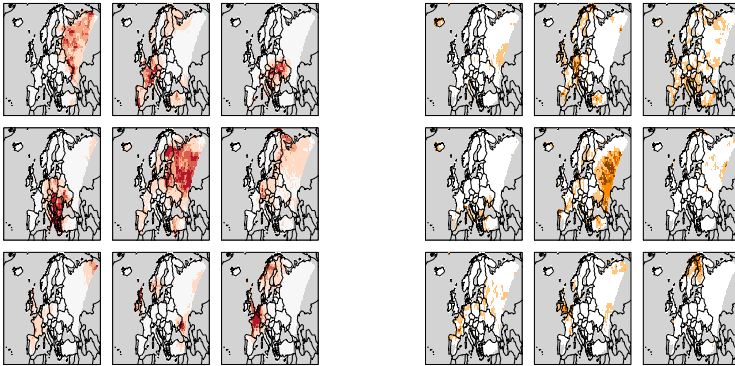


02.09.2022 12:28 Uhr

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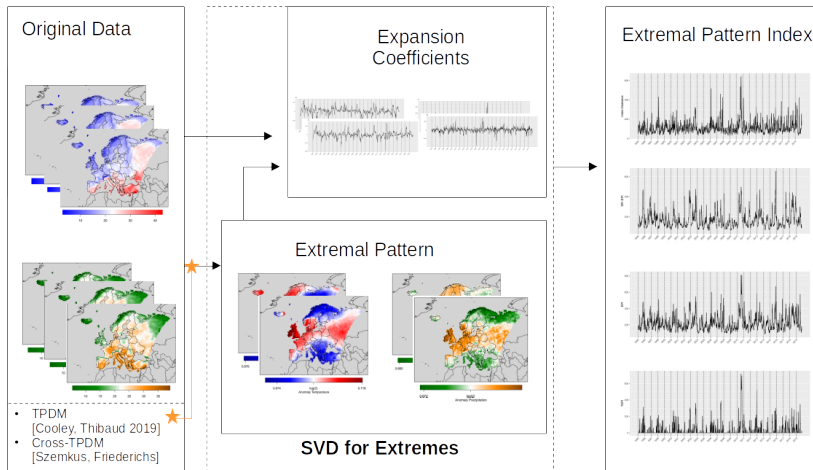
Climate change detection and attribution in Heatwaves and precipitation deficit using compact representations



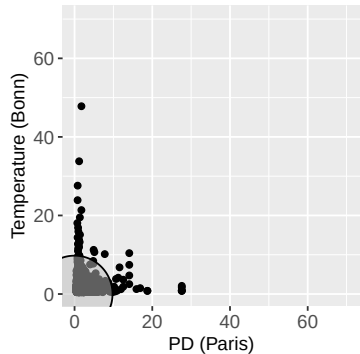
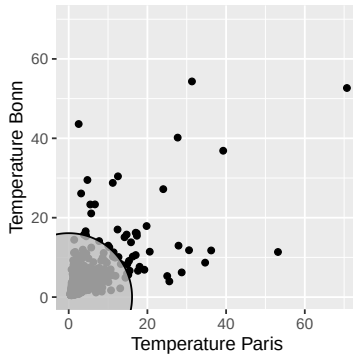
Extremal Pattern Index (EPI)

- Pattern based spatial aggregation
- Based in multivariate extreme framework

Extremal Pattern Index (EPI)



The Tail Pairwise Dependence Matrix (TPDM)^{1 2}

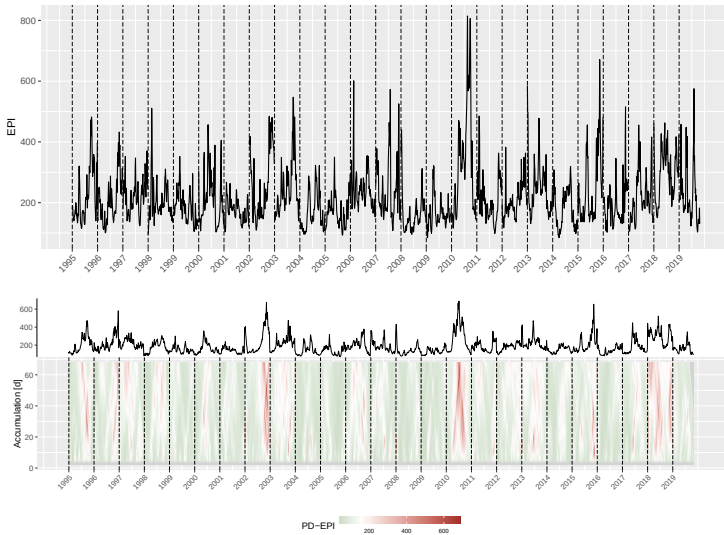


$$\hat{\sigma}_{ij} = 2n_{exc}^{-1} \sum_{t=1}^n w_{t,i}^x w_{t,j}^y \mathbb{I}(r_{t,ij} > r_{0,ij}).$$

¹Cooley and Thibaud, “Decompositions of dependence for high-dimensional extremes”.

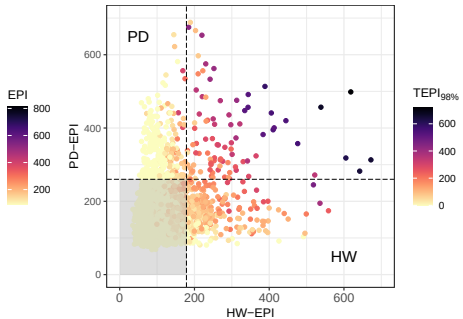
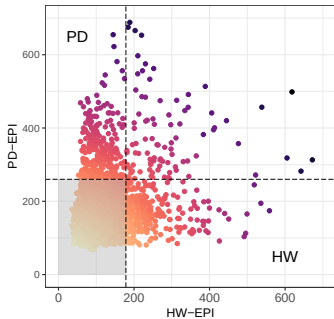
²Resnick, “Heavy-tail phenomena: probabilistic and statistical modeling”.

$$\text{EPI}_t^\eta = \sqrt{\sum_{k=1}^m \eta_{t,k}^2}$$

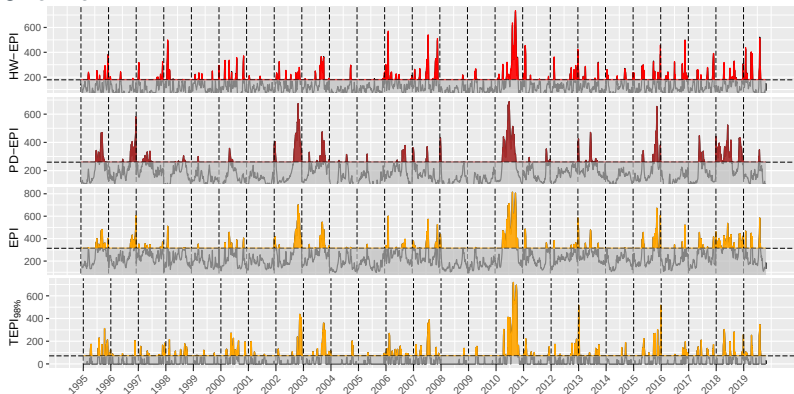


$$1) \text{EPI}_t^{\eta, \nu} = \sqrt{\sum_{k=1}^m (\eta_{t,k}^2 + \nu_{t,k}^2)}$$

$$2) \text{TEPI}_t^{\eta, \nu} = \sqrt{\sum_{k=1}^m (\eta_{t,k}^2 + \nu_{t,k}^2) \mathbb{I}_{(\eta_{t,k} > q_\eta, \nu_{t,k} > q_\nu)}}$$



Overview EPI



Advantages:³

- Spatial aggregation for Extremes
- Identification of Extremes based on
 - Spatial Extent
 - Intensity
- Applicable to further variables

Future Work: Provide EPI for D&A-Study:

- Scedasis Functions⁴
- Bayesian Framework [Friederichs, Buschow, Szemkus, Hense]

³Szemkus and Friederichs, "Identification of spatial patterns in relation to heat waves using the singular value decomposition of extremal dependencies".

⁴Cabral, Ferreira, and Friederichs, "Space-time trends and dependence of precipitation extremes in North-Western Germany".

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Thanks for your attention!