

Decomposing weather maps into interpretable patterns using Latent Dirichlet Allocation

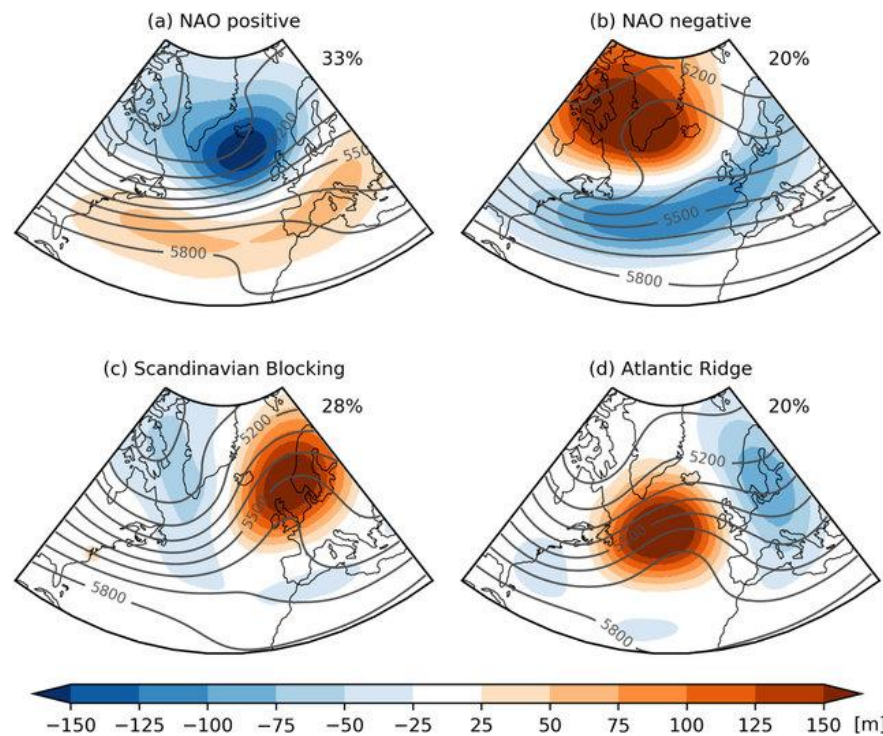
Lucas Fery, Berengere Dubrulle, Berengere Podvin, Flavio Pons, Davide Faranda

Traditional dimensionality reduction techniques (PCA, k-means...) :

- finite set of **abstract modes** or **typical field configuration**
- each map \leftrightarrow other map(s) composed of **mixture of coherent patterns**.

\Rightarrow **Lack of interpretability**

\Rightarrow **Use a method from Natural Language Processing (NLP) to decompose maps into intelligible single coherent patterns**



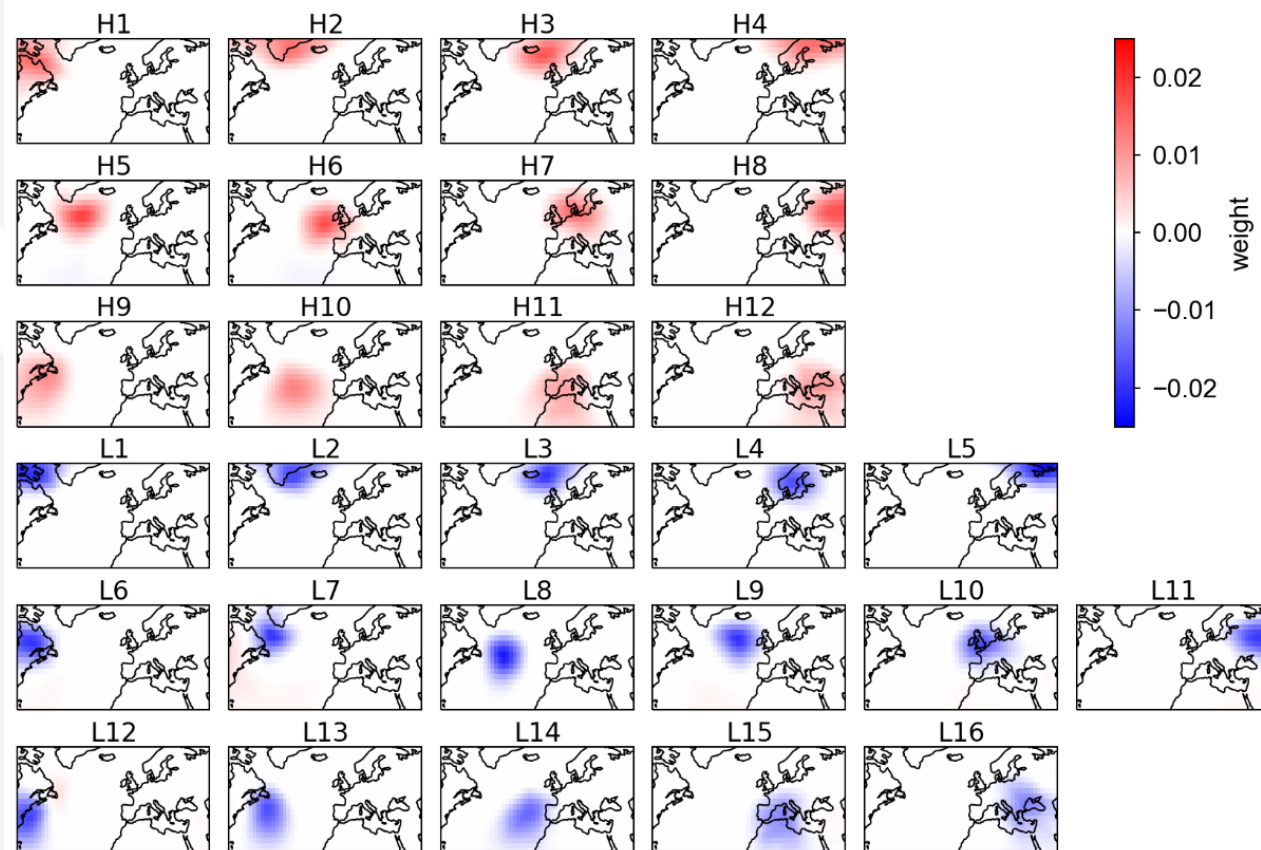
Van der Wiel et al. 2019



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- **Daily sea-level pressure anomalies** over the North Atlantic from NCEP reanalysis between 1948 and 2018
- LDA with **28 spatial patterns**
- **Individual synoptic structures** analogous to cyclones and anticyclones.



Fery et al. 2022

