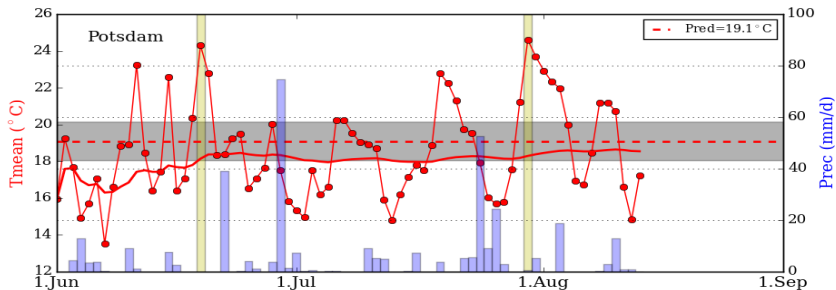


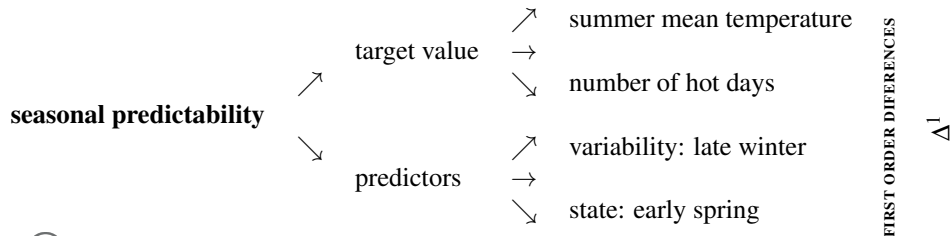
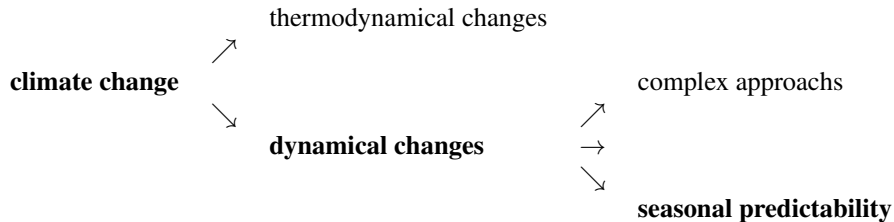
Enhanced seasonal predictability of the summer mean temperature in Central Europe favored by new dominant weather patterns

P. Hoffmann



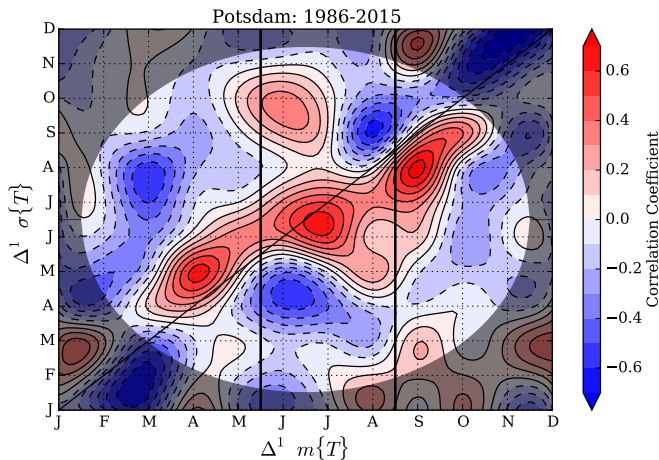
EMS2017: SUB-SEASONAL-TO-SEASONAL PREDICTIONS (OSA2.4)

1. Concept of the diagnostic/prediction Tool



1.1. From Correlation Matrix to Regression Model

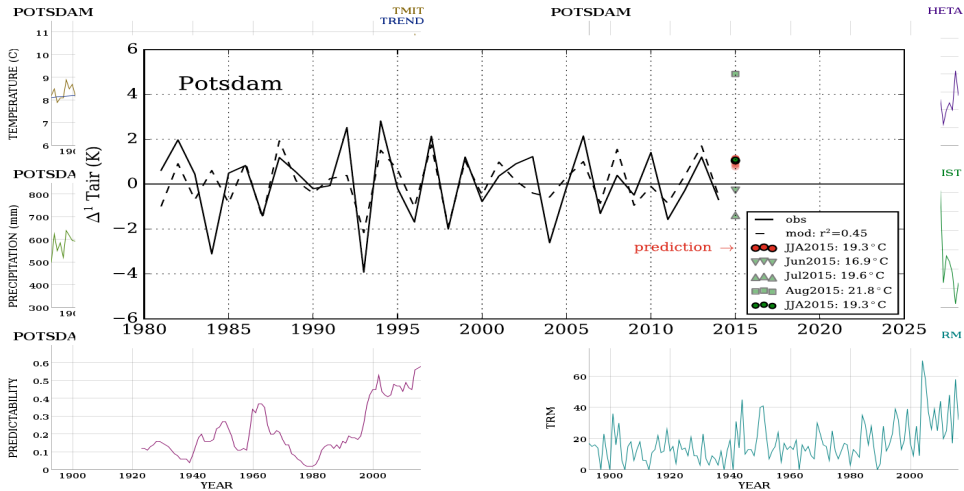
$$\text{corr}(m\{T_{JJA}\}, \sigma\{T_{Apr}\}) = \text{neg.}$$



$$T_{JJA} = \text{const} + a \cdot \sigma(T_{Jan}) + b \cdot \sigma(T_{Feb}) + c \cdot \sigma(T_{Mar}) + d \cdot \sigma(T_{Apr}) + e \cdot m(T_{Apr}) + \text{err}$$

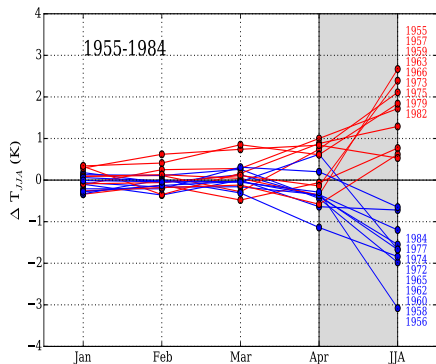
2. Local (Potsdam)

Local Climate Monitoring: Potsdam



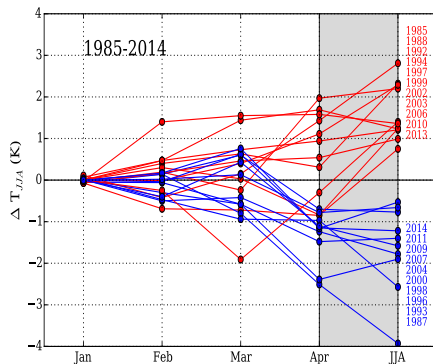
2.1. Long-Term Analysis

past:



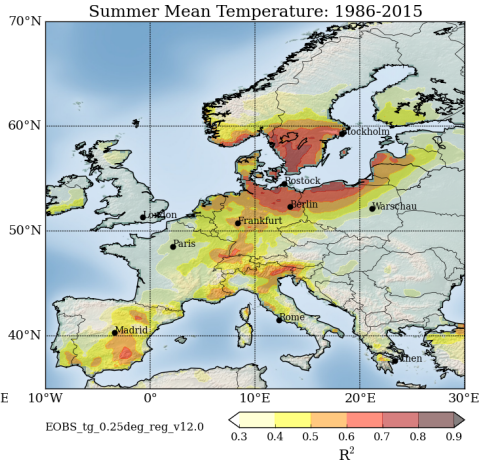
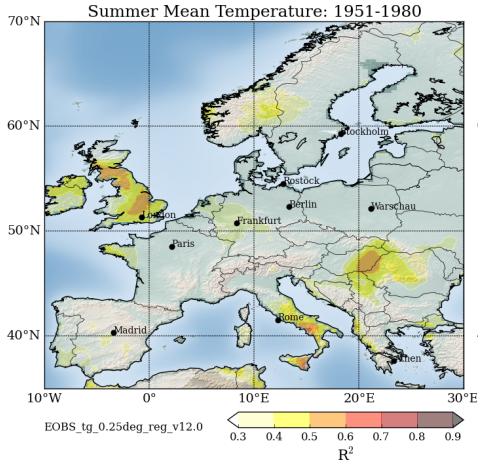
weak contributions

recent:



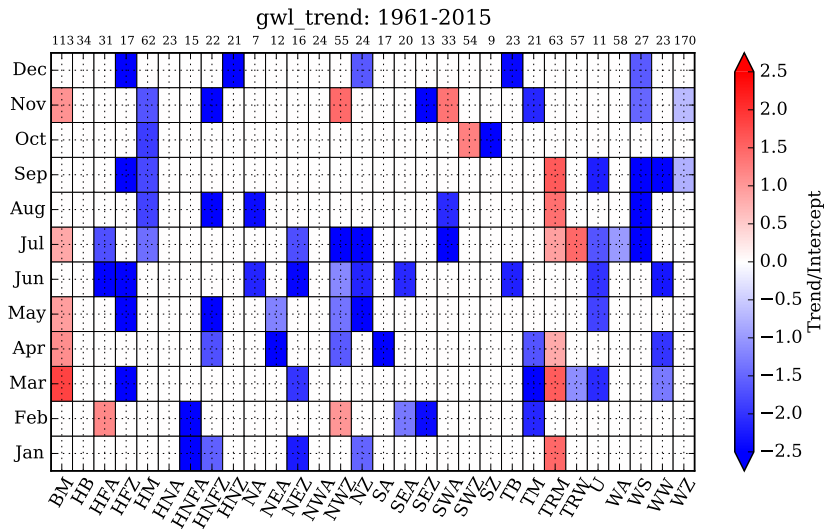
strong contributions

3. Regional (Europe)

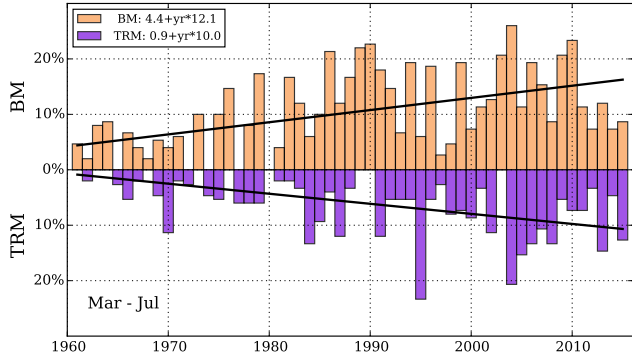
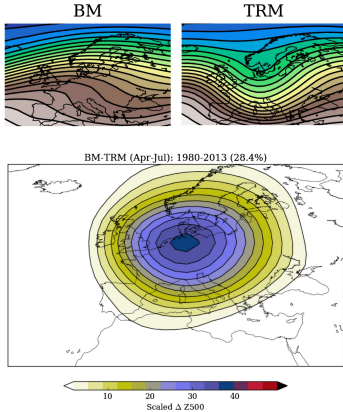


Circular R^2 -Pattern over the Baltic Sea (for recent climate)

3.1. Hess/Brezowsky Weather-Type Analysis



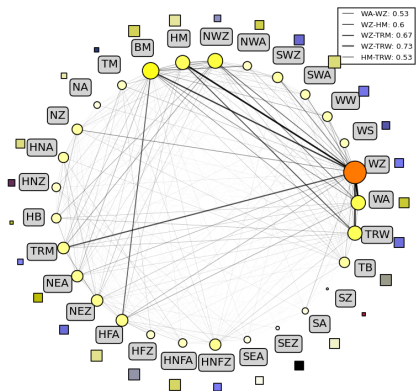
3.2. New Dominant Weather-Types



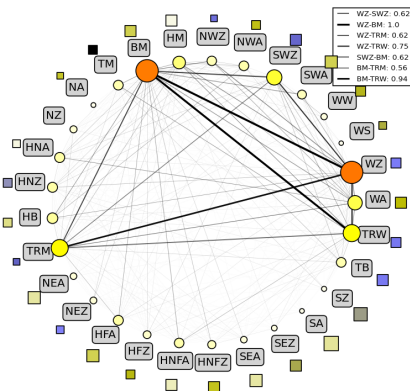
| | | | |
|------------|-----------------------------------|------------|------------|
| BM | Zonal Ridge across Central Europe | Heat Waves | 30% |
| TRM | Trough over Central Europe | Heavy Rain | |

3.3. Sequences of Weather-Types

Sequence of European Weather-Types between 1951-1980 (Apr-Aug)

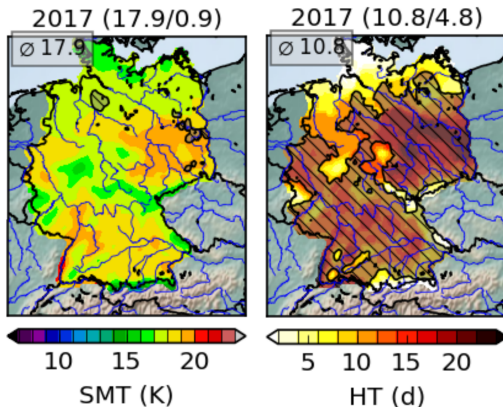


Sequence of European Weather-Types between 1987-2016 (Apr-Aug)

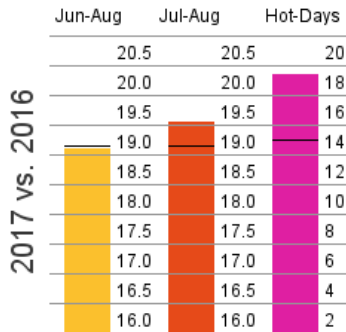


4. National (Germany): update 2017-05-01

Germany 2017



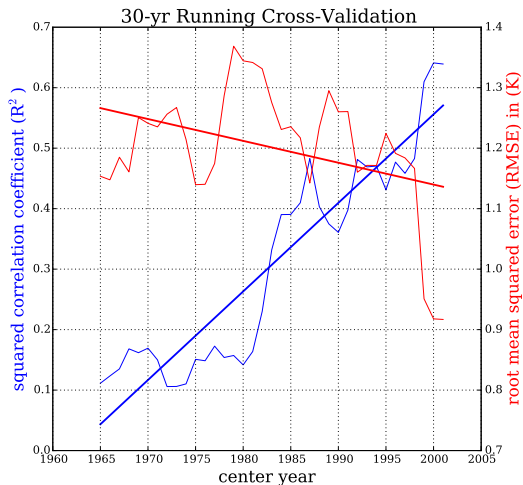
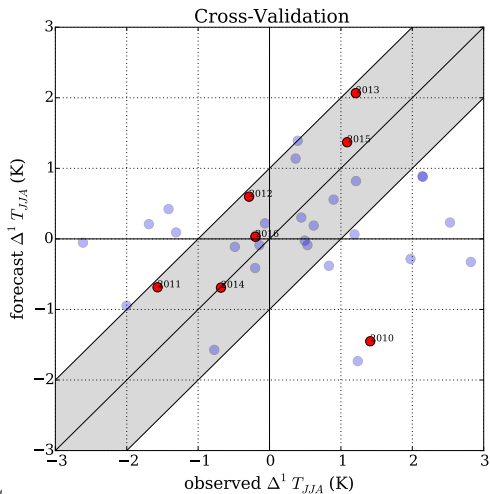
Potsdam 2017



(c) peterh@pik-potsdam.de

SMT2017 similar to SMT2016 +++ HT2017 more than HT2016 ↪ more extreme weather events

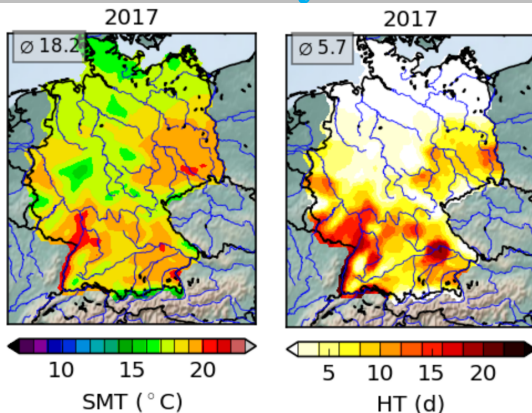
4.1. Seasonal Prediction Skill for Potsdam



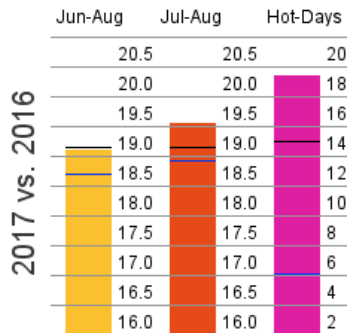
Potsdam: Prediction of the last 3 years nearly perfect !

4.2. Evaluation of the Prediction 2017: update 2017-09-01

Germany 2017



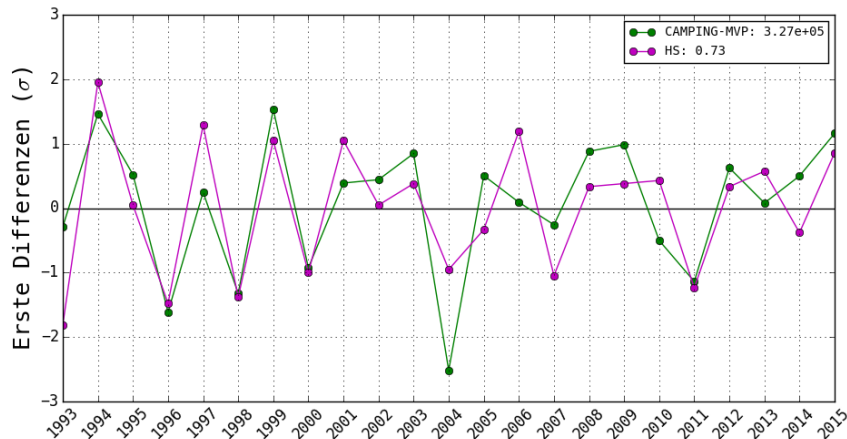
Potsdam 2017



(c) peterh@pik-potsdam.de

$\Delta \text{SMT}_{2017} = -0.4\text{K} +++$ $\Delta \text{HT}_{2017} = -4\text{d}$ \hookrightarrow record breaking rainfall events in Central Europe

4.3. Application: Camping Tourism around the Baltic Sea



High correlation between $T_{Jul-Aug}$ and “overnight stays” in “Mecklenburg-Vorpommern”!

5. Summary & Conclusions

- Seasonal predictability measure for detecting circulation changes over Europe
- Enhanced seasonal predictability of the summer mean temperature over the Baltic Sea
- Circular Pattern can be explained by two new dominant weather patterns

CAUTION: Both favor extreme weather events: BM (heat waves) & TRM (heavy rain)

- A linkage to a weakening jet stream caused by changing temperature gradients is supposed

Clim Dyn
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