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Assessing the seasonal forecast performance of hydrological extremes over Europe

EGU General Assembly 2022

Objectives:

1. Assess the predictability of low/high streamflow extremes

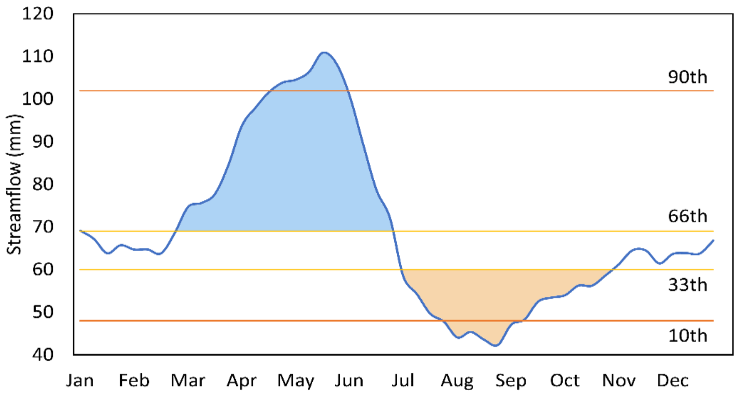
2. Compare the predictabilities for different lead times and at different river systems

3. Understand the drivers leading to the difference in predictability

Methods:

Reference:	Pseudo-observations (model simulation)
Extremes:	10th (low) and 90th (high) percentile
Benchmark:	Simulated climatology
Evaluation metric:	Brier Skill Scores; BSS10, BSS90
	$BS = \frac{1}{T}\sum_{t=1}^{T}\left(P\left(X(t)\right) - \mathrm{sgn}(ref)\right)^2$
	$BSS = 1 - BS_{sys}/BS_{ben}$ $(-\infty$ to $1)$
Evaluation periods:	Low / high streamflow periods (<33th / >66th)

Hydro model:	E-HYPE (35408 subbasins)
Reference forcing:	HydroGFD product v2.0
Meteo forcing:	Bias-adjusted ECMWF SEAS5 forecasts
Period:	1993-2015
Ensemble:	25 members
Initialization:	Every month
Max lead time:	30 lead weeks



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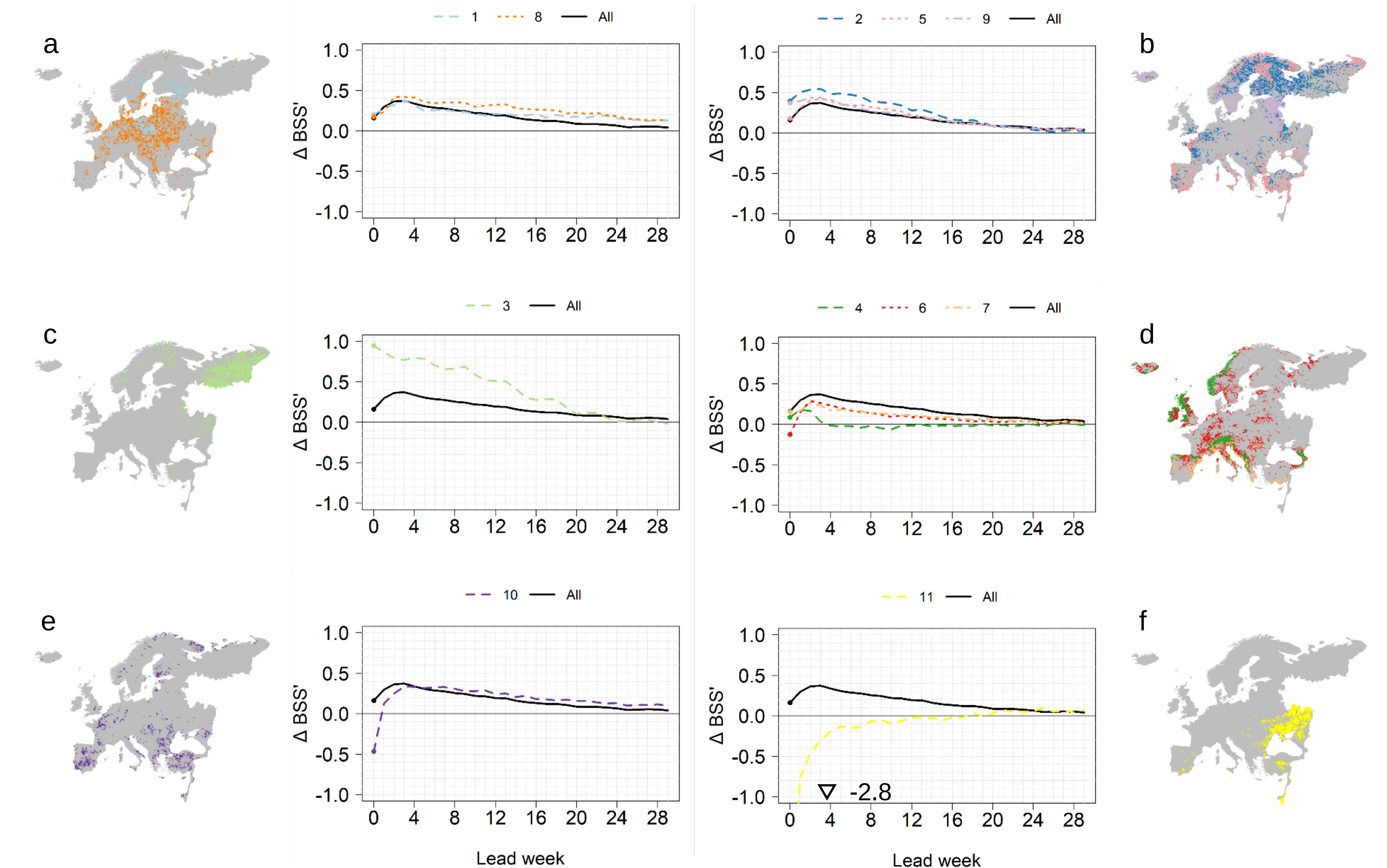
What are the drivers leading to different predictabilities of hydrological extremes?



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Conclusions:

The predictability of the seasonal streamflow forecasts on low/high streamflow extremes

1. varies geographically, deteriorates with increased lead weeks.

2. can be regionalized, based on a priori knowledge of the local hydrological conditions.

3. has a link to hydrological similarity.

The insights are of high value to operational continental and global **climate services** and to users/stakeholders that are dependent on seasonal water fluctuations.

Thanks for sharing your insights with us!

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