

SEASONAL HYDROLOGICAL FORECASTING OVER EUROPE: PROSPECTS AND APPLICATIONS

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Background and objectives

Skilful forecasts of hydro-meteorological extremes are essential for the water sector for applications such as navigation, hydropower management and urban water supply. In a world where water-related natural hazards will continue to increase in intensity and frequency, the incentive to assess and improve the skill of state-of-the-art forecasting systems is growing.

These lay the foundations of my PhD research (beginning October 2015) as part of the IMPREX project (IMproving PRedictions and management of hydrological EXtremes), Horizon2020. "IMPREX is based on the philosophy that understanding present-day risks is an effective starting point for adapting to unprecedented future events."

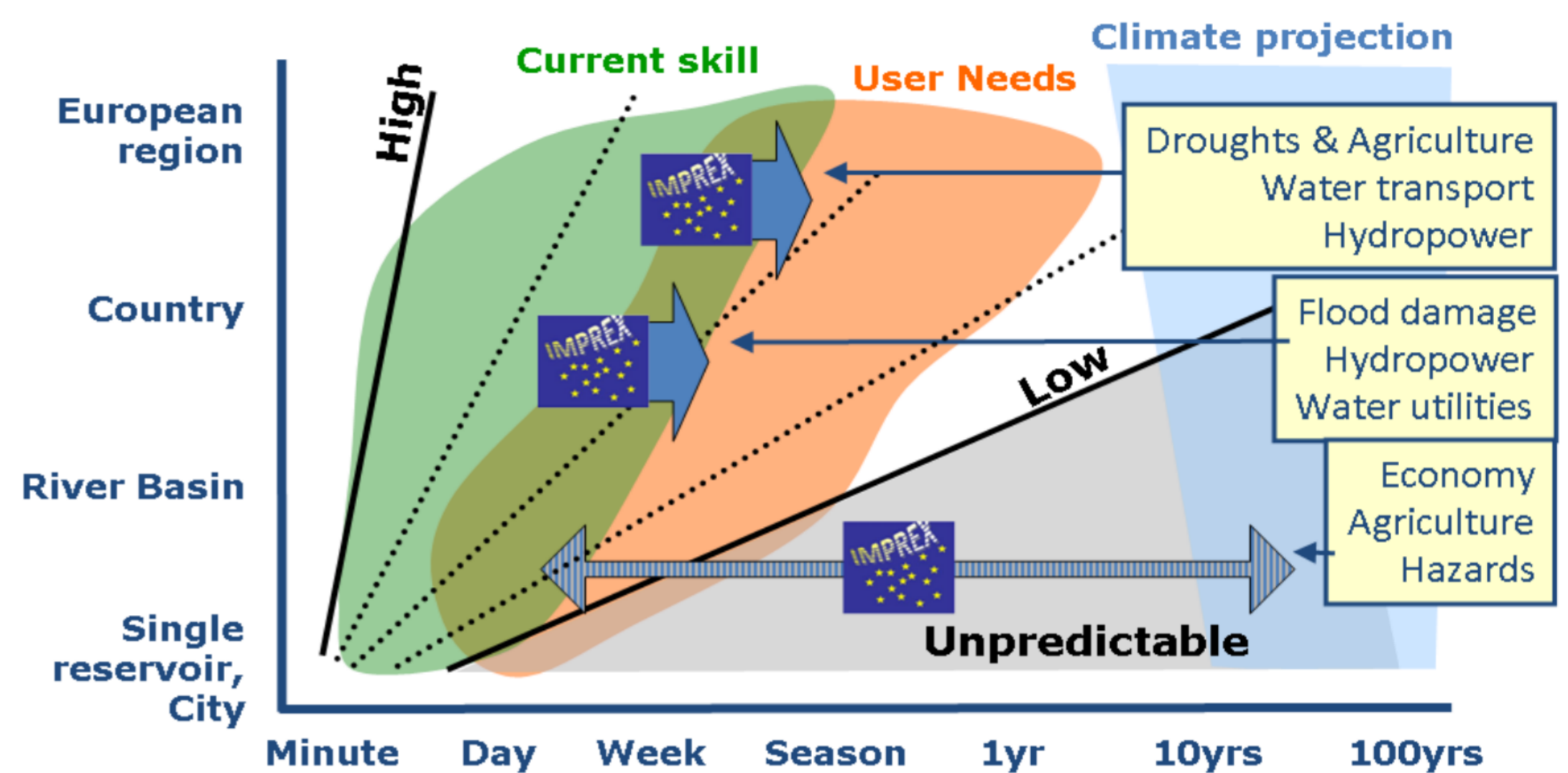


Figure 1: Predictability of weather and climate models across spatial and temporal scales

IMPREX structure

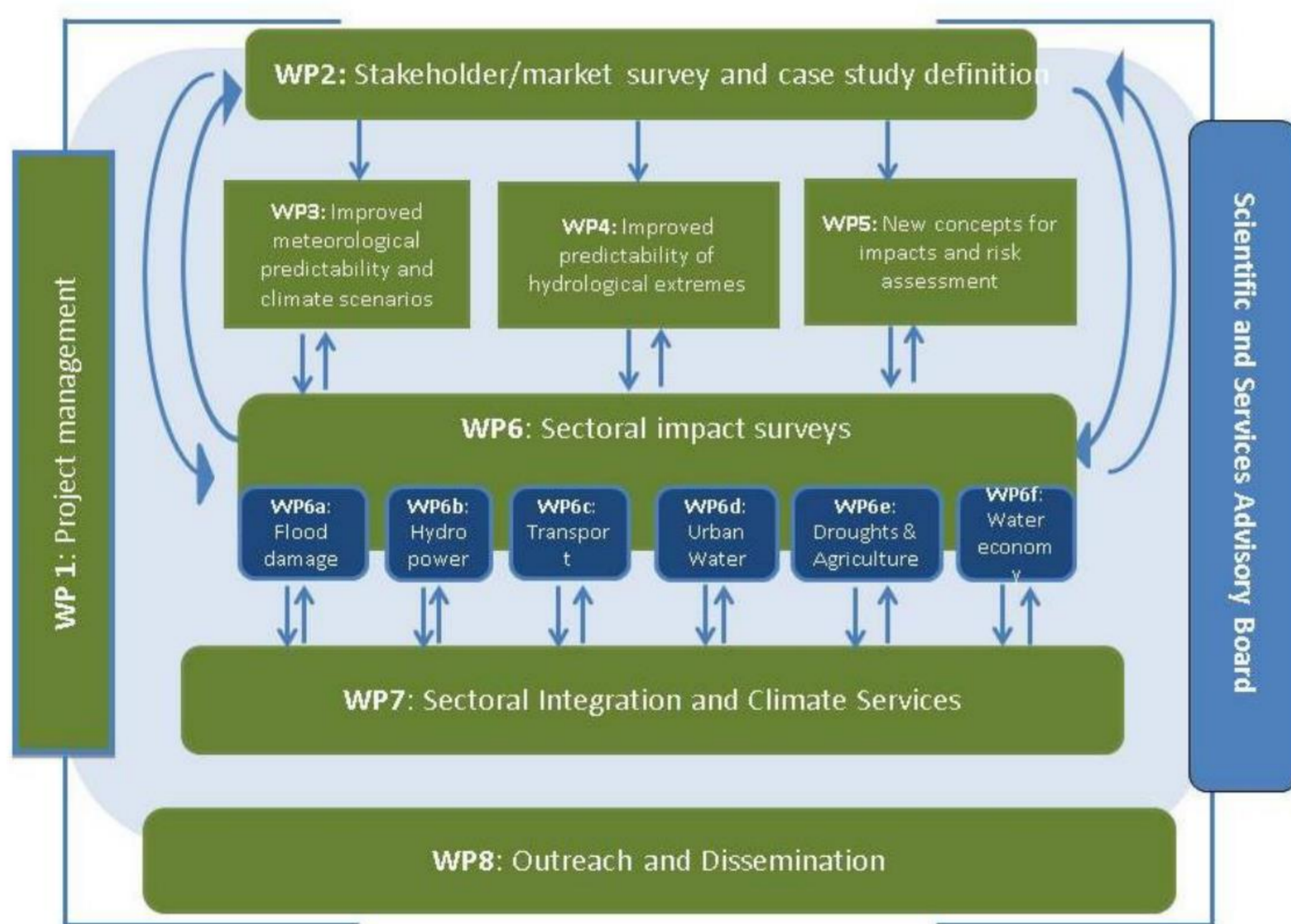


Figure 2: Structure of the IMPREX project

My tasks

• Improved predictability of hydrological extremes (WP4):

1. Development of a regional and European scale reforecast dataset of hydrological extremes

- Multiple models
- 1980 to 2015
- Verification based on hydrologic threshold exceedances

– **Results:**

- Identification of current skill of individual models for specific sectoral applications
- Guidance for model improvements

2. Analysis of impact of changes in precipitation attributes for short, medium, seasonal and climatic ranges

- Sensitivity analysis
 - Multiple models
 - Precipitation forcing data from various meteorological forecast systems (WP3)
 - Verification performed against hydrologic gauging stations across Europe
- Assessment of impacts of forecast initialisation and forcing on hydrological extremes predictions

– **Results:**

- Production of a hydrological sensitivity chart showing where targeted improvements should focus
- Overview of improvements made in WP3 on hydrological processes
- Development of score cards easily visualised and communicated to users

• Sectoral survey: flood inundation prediction and risk assessments (WP6b):

- Southwest England river basin case study (Environment Agency)



References

1. IMPREX project: http://cordis.europa.eu/project/rcn/196811_en.html

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