

Progress in Primavera's WP10

analysing use cases

November 29th



Primavera General Assembly, De Bilt

Introduction



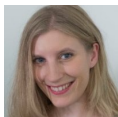
What are we supposed to do?

⇒ **specific 'use case'** ⇒

**analysis of added value
of Primavera runs vs.
earlier simulations**

Division of work

Group	Physical processes concerned	Target sectors
UKMO	Extreme storms	Insurance
UKMO	Wind storms	Insurance, Transport
SMHI	Extremes in precip & wind	Hydropower
UREAD	Surface climate variability	Energy
BSC	Surface winds	Energy, Insurance, Agriculture
KNMI	Heat waves & droughts	Agriculture, Health



Eveline van der Linden (KNMI)



Paula Gonzales (UREAD)

What to store from the simulations?

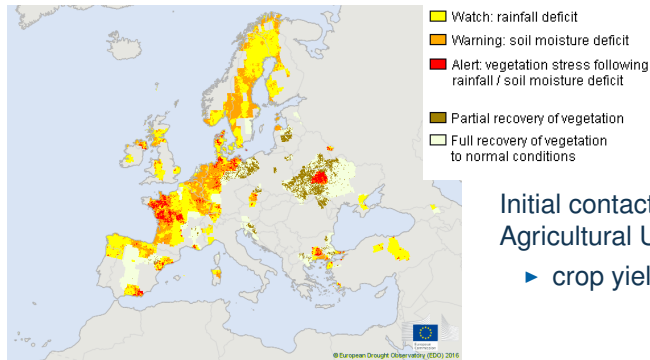
variable/diagnostic lists for Stream 1 simulations - the 'PRIMAVERA_output.xlsx' spreadsheet

parameter	ideal	plan B
Precipitation, Temperature, Humidity	3h	6h
Surface Downwelling Shortwave Radiation	3h	6h
Wind Speed (10m) & gust	3h	6h
Surface Air Pressure	3h	6h
Total Cloud Fraction	3h	6h
U Wind (50 & 100m)	3h	6h
V Wind (50 & 100m)	3h	6h
theta-on-PV2	6h	
Soil moisture on all levels	daily	

**discussions between David Brayshaw, Laurent Terray,
David Hein, Dan Hodson**

Work in progress

Contacting users and literature survey of user needs

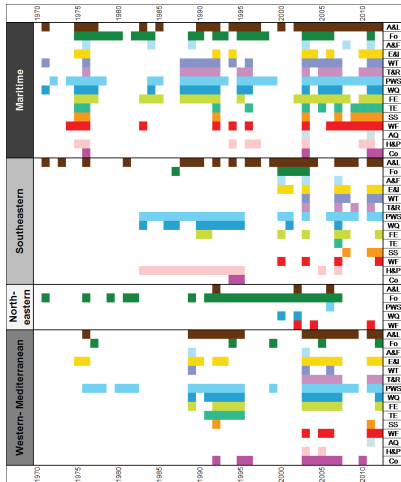


Initial contacts with Wageningen
Agricultural University

- crop yield modelling

Work in progress

Example: far-reaching effects of droughts

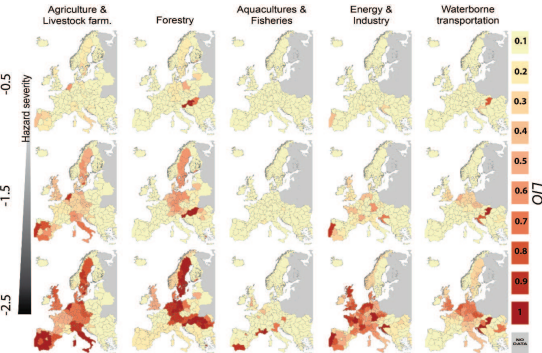


- ▶ Agriculture and Livestock Farming
- ▶ Forestry
- ▶ Energy and Industry
- ▶ Waterborne transportation
- ▶ Tourism
- ▶ Human Health and Public Safety

Source: Blauhut et al. (2016) HESS

Work in progress

Users are interested in impacts - not an index

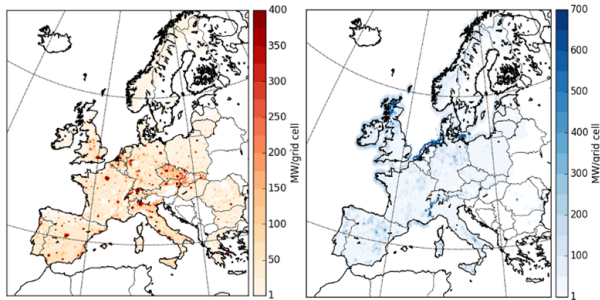


‘Simple’ temperature & precipitation change assessments are less relevant

- ▶ Drought risk maps (~ Likelihood of Impact Occurrence)
- ▶ Drought index is based directly on observational/model data
 - ▶ -0.5: near normal
 - ▶ -1.5: severely dry
 - ▶ -2.5: extremely dry
- ▶ Damage function

Work in progress

PV and wind capacity distribution in 2050



Power systems pose specific challenges

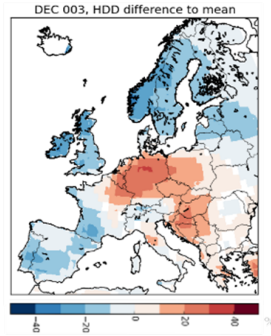
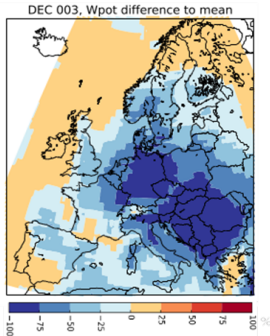
- ▶ spatial localisation (~ topography)
- ▶ high-frequency time dependencies
- ▶ spatial connections and compound meteorological sensitivities

Distribution of PV panels and wind turbines over Europe in 2050.

Source: Jerez et al. (2015) doi:10.1016/j.rser.2014.09.041

Work in progress

Vulnerability of the renewable energy sector



Source: Paul Ravestein

relative importance of climate change vs. climate variability to renewable energy yield

- ▶ for Europe & in winter: largest share of renewable energy through windpower
- ▶ 'worst case' situations
 - ▶ periods of ~ 10 days where wind energy yield at lowest levels
 - ▶ coincide with periods of high demand