



Variability and changes of climate conditions in the European Alps over the 20th century: from observational networks to numerical simulations

Ménégoz M., Valla E., Beaumet J., Anquetin, S., Blanchet, J., Fettweis X., Gallée H., Jourdain, N., Morin S., Verfaillie D., Wilhelm, B.

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Who are we and what are we investigating?

IGE researches: observations, global and regional models for climate studies

Socio-environmental **TRAJECTORIES** in the Alps, interdisciplinary approaches



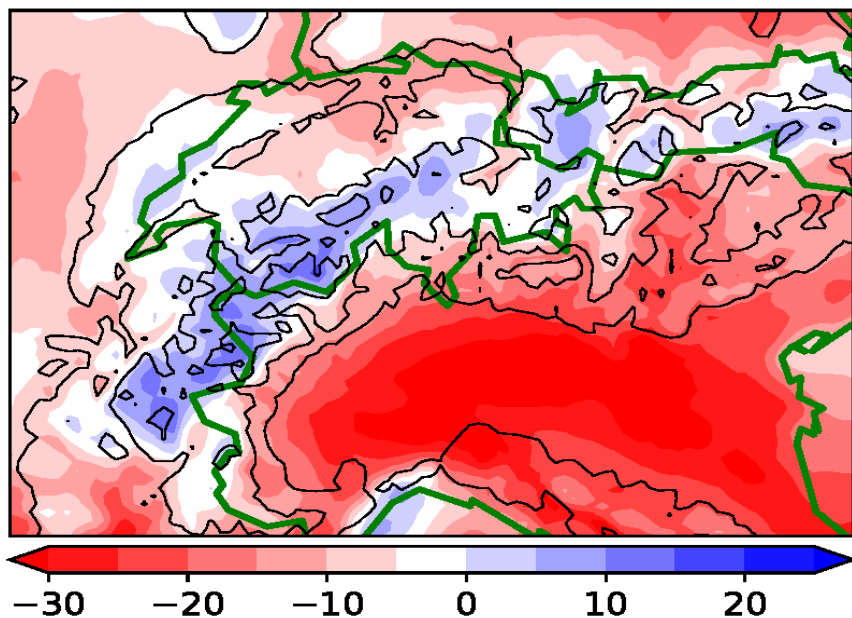
Precipitation, temperature and wind change in the Alps over 1900-2010:

- Application of the limited area model MAR (IGE, <http://mar.cnrs.fr>)
- Resolution of 7km, using ERA20C as boundaries conditions

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Precipitation changes (Valla et al., in prep)



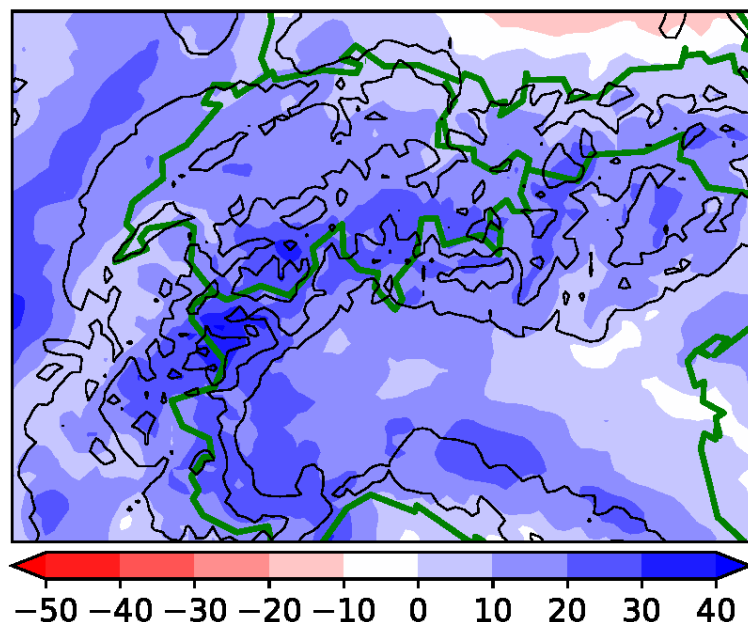
Trend in the annual mean of precipitation
over 1903-2010, in $\% \cdot \text{century}^{-1}$

- Increase in precipitation above 1500 m, up to 20% -> stronger daily rates in winter
- Drying below 1500m, up to 30% -> reduction in the number of wet days in summer

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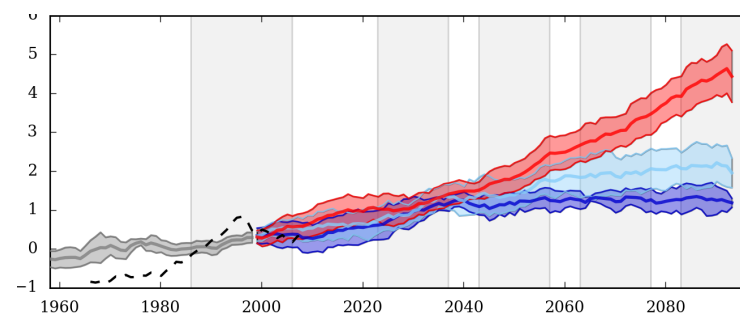
- Extreme precipitation amplified, up to 30-40%, a signal significant ($p\text{-value} < 0.05$) only when considering long time series (40 to 70 years)

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Ongoing work and future plans

- Temperature and wind changes
- Future scenarios
- Questions:
 - ✓ Which priorities for model developments: GCMs, RCMs, statistical downscaling?
 - ✓ Which strategy to better answer the socio-environmental challenges in the Alpine region?



Winter temperature estimated at 1500m in the Maurienne valley (ADAMONT downscaling, Verfaillie et al., 2017)