20th Century extratropical cyclone climatology and risk assessment

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The passage of extra-tropical storms over populated regions, especial cities may cause severe damage. Storms like Lothar and Martin (1999) or Xynthia (2010) are examples of the consequences of storms that crossed continental areas with very strong surface winds producing big losses .

In this study we intend to better understand the climatology of storms during the last century and their impacts. In order to do that we used the new-released long-term ERA-20C reanalysis from ECMWF to identify and track winter extratropical cyclones since the beginning of the 20th Century until 2010. The tracking algorithm used was from Ayrault, 1998 which uses relative vorticity maximum at 850hPa.
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Secondly we decide to quantify the severity of each storm for the same period of time, i.e. every winter, using the same time resolution and a spatial resolution of 0.25 x 0.25 degrees. We used the index by Pinto et al. 2012 and ERA20-C 10-m wind data , to compute the "Loss index" for several countries in Europe.

Finally, using the extra tropical cyclone climatology and the loss index information for each country we related the amount of losses and the clustered cyclones trajectories.

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Pinto, J. G., M. K. Karremann, K. Born, P. M. Della-Marta, and M. Klawa (2012), Loss potentials associated with European windstorms under future climate conditions, Clim. Res., 54, 1–20.