The Autumn season of 2000 saw record rainfall and flooding in western Europe. It was the wettest Autumn in England and Wales since records began in 1766, several regions from France to Norway received double their average rainfall and there were severe floods and mudslides in the southern Alps (1). There was evidence in Autumn 2000 of anomalous descent and drying in the tropics, over the Atlantic and South America. Precipitation variability there showed a weak (negative) correlation with the index of the Scandinavia pattern (5). Could anomalies in this region trigger the pattern? Numerical experiments with a barotropic model confirm this hypothesis, with anomalous tropical vorticity forcing generating a wave-train extending over Europe (6; centre: right-panel).

The Autumn precipitation time-series contains no significant trend in total Autumn precipitation, but there is the suggestion of increasing interannual variability, which warrants further investigation. Any such trend would increase the risk of future extreme events.

The displaced Atlantic jet-stream was part of an extended pattern of large-scale anomalies, extending from the mid-latitude across Europe and Scandinavia to the Aleutian low. The displaced jet acted to "steer" intense weather systems repeatedly into western Europe.

A barotropic model simulation of the global response of the weather field to specified vorticity forcing, associated with either divergence, convergence or tropical weather systems (Barnston and Livezey, 1987, J. Atmos. Sci., 44, 1289-1301). In the tropics the model represents the upper tropospheric flow in the layer of divergent convective outflow. In the extra-tropics it represents the deep equivalent barotropic atmospheric structure. The Autumn climatological flow at 300hPa has been test forced in the model by computing the climatological vorticity forcing necessary to maintain a geostrophic state, and a specified anomalous forcing has been added. The model is designed to test at times to obtain a steady state response. Linear damping is included to crudely represent non-adiabatic processes.

A regression of geopotential height with England-Wales precipitation data for Autumn 2000-99, shows a pattern of statistically significant anomalies skewed relative to a Gaussian distribution but a square root transform, which minimises skewness, and detrending makes no discernible difference to the regressions. The displaced jet-stream was part of an extended pattern of large-scale anomalies, extending from the mid-latitude across Europe and Scandinavia to the Aleutian low. The displaced jet acted to "steer" intense weather systems repeatedly into western Europe.

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