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Atmospheric teleconnections initiated by an anomaly of the Mediterranean Sea

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Atmospheric responses to an idealized cooling of the Mediterranean sea are studied in a general circulation model through a homogeneous decrease of 2 K for the sea surface temperature. The ensemble approach is used to evaluate the transient or time-dependent characteristics of the response. Just in the downstream region, from the eastern Mediterranean basin to the whole Asian continent (following the sub-tropical jet-stream), a baroclinic response is produced with high pressure near the surface and low pressure in the upper layers. It is the direct response to the Mediterranean cooling and it needs only a few days to be established. Two remarkable remote structures are the deepenning of the Aleutian Low in the North Pacific and the weakening of the Icelandic Low in the North Atlantic. The two teleconnections need several days in the North Pacific and even several tens of days in the North Atlantic to form and to grow. Both of them have a quasi-barotropic vertical structure. It is believed that they are the consequence of complex interactions between the mean flow and the transient eddies in the atmosphere.