



Two El Niño Types and their Teleconnections with Europe

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Very recently there have been numerous reports on a “new” type of El Niño, which is characterized by predominantly positive sea surface temperature anomalies in the tropical Central Pacific rather than in the East Pacific. Different names were given to this phenomenon: “Central Pacific El Niño”, “Warm Pool El Niño”, “Dateline El Niño”, and “El Niño Modoki” as well as, based on a more process oriented study of El Niños in coupled ocean-atmosphere circulation models, S(urface)- and T(hermocline)- mode. The Central Pacific El Niño type is not a new phenomenon, however, but was frequently observed already during the first few decades of the 20th century. The two El Niño types were described by Graf (1986) as events driven solely by local surface wind anomalies not including the thermocline and events following the delayed oscillator theory, including deepening of the thermocline by propagating Kelvin waves, respectively.

In this contribution we shall outline the effects the two different types of El Niño have on weather and climate in Europe and worldwide. We provide evidence for a tropospheric mechanism based on the Subtropical Jet wave guide that links Rossby waves induced by equatorial precipitation anomalies with the atmospheric circulation over the subtropic North Atlantic and Europe quite efficiently in case of Central Pacific SSTA, much less efficient for East Pacific SSTA. The latter mainly affect the strength of the boreal winter stratospheric polar vortex. Both mechanisms excite a negative phase of the North Atlantic Oscillation, leading to negative temperature anomalies over Europe in winter. In case of Central Pacific El Niño this effect is more robust since both Atlantic Centres of Action, the Icelandic Low and the Azores High, are involved by different mechanisms. We shall also, based on the analysis of observations, discuss the effects arising from the bias of several climate models towards Central Pacific El Niño.