



Testing the sensitivity of trade linkages in Europe to compound drought events

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Droughts can be defined as spatially extensive events that are characterized by temporal deficits in precipitation, soil moisture or streamflow, and have the potential to cause large direct and indirect economic losses. Many European countries face drought as an economically important hazard, with agriculture, livestock, forestry, energy, industry, and water sectors particularly at risk, causing economic losses of 139 billion US\$ over the past 30 years. Apart from these direct impacts, business production and the flow of goods and services can be affected indirectly by droughts. With consequences that can propagate through the economic system affecting regions not directly hit by the drought event itself, or in time-periods long after the original drought event occurred.

In this study, we evaluate the sensitivity of existing trade linkages between the different NUTS-2 regions in Europe to the coupled occurrence of hydro-meteorological drought events, and their associated production losses. Using a multi-regional supply-use model for Europe, we have, on a product level, insight in the existing trade linkages between NUTS-2 regions. Using this information in combination with historical drought data, we assessed and identified for a selection of water related products: 1) the dependency-structures of the NUTS-2 regions within Europe for the import and export of products (and therein water); 2) the coupled nature of drought events occurring in regions that are linked via these trade-patterns; 3) the probability of not meeting demands (on a product level) due to drought events and the associated (indirect economic) impacts; and 4) regions that lose or benefit from their selection of trade-partners given the coupled nature of drought events, as well as the net effects for Europe as a whole.