

nederlandse



natuurkundige vereniging

**Symposium 'Climate, seas and oceans'**  
***Current status and latest developments in modeling,  
observations and processes***

**Locatie: DIFFER, Eindhoven**  
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**Processes of local climate change**

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Solar radiation warms the Earth, outgoing thermal radiation cools the Earth. The global mean temperature changes as long as there is a net flux of energy at the top of the atmosphere. Increasing amounts of molecules in the atmosphere that absorb the thermal radiation emitted from the earth's surface, reduce the outgoing thermal radiation at the top of the atmosphere. The Earth warms, outgoing thermal radiation increases until it matches the net solar flux. Since 1850-1900 the Earth has warmed by 1,2 degrees in response to an increase of greenhouse gasses. CO<sub>2</sub> is the main contributor and its concentration has risen from 280 ppm to 420 ppm (parts per million, or one CO<sub>2</sub> molecule per million air molecules) due to the large-scale combustion of fossil fuels and the production of cement.

The warming is accompanied by adjustments worldwide in winds, vertical stability, patterns of rainfall, clouds, snow- and ice cover, the exchange of heat, momentum and water with the ocean and land, vegetation cover, soil moisture, ocean currents, sea surface temperatures, sea-ice cover to name a few. The climate change in a particular region is the result of the complex interactions among all of these aspects of climate.

In this talk I will discuss the processes and interactions that determine the local climate change in the Euro-Atlantic region. Uncertainties in the strengths of these interactions explain the spread in the projected regional climate change by climate models in response to scenarios for future emissions of greenhouse gasses.