



## **Processes Understanding of Decadal Climate Variability**

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The realistic representation of decadal climate variability in the models is essential for the quality of decadal climate predictions. Therefore, the understanding of those processes leading to decadal climate variability needs to be improved. Several of these processes are already included in climate models but their importance has not yet completely been clarified. The simulation of other processes requires sometimes a higher resolution of the model or an extension by additional subsystems. This is addressed within one module of the German research program “MiKlip II – Decadal Climate Predictions” (<http://www.fona-miklip.de/en/>) with a focus on the following processes. Stratospheric processes and their impact on the troposphere are analysed regarding the climate response to aerosol perturbations caused by volcanic eruptions and the stratospheric decadal variability due to solar forcing, climate change and ozone recovery. To account for the interaction between changing ozone concentrations and climate a computationally efficient ozone chemistry module is developed and implemented in the MiKlip prediction system. The ocean variability and air-sea interaction are analysed with a special focus on the reduction of the North Atlantic cold bias. In addition, the predictability of the oceanic carbon uptake with a special emphasis on the underlying mechanism is investigated. This addresses a combination of physical, biological and chemical processes.