EGU24-8603, updated on 20 May 2024
https://doi.org/10.5194/egusphere-egu24-8603
EGU General Assembly 2024


# Cloud-feedbacks in global km-scale earth system model simulations

**Ja-Yeon Moon**[1,2], Sun-Seon Lee[1,2], Axel Timmermann[1,2], Jan Streffing[3], Tido Semmler[3,4], and Thomas Jung[3]

[1]Center for Climate Physics, Institute for Basic Science, Busan, South Korea
[2]Pusan National University, Busan, South Korea
[3]Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven, Germany
[4]Met Eireann, Dublin, Ireland

Clouds are an important regulator of earth's radiation balance. Therefore, future changes in clouds and corresponding feedbacks are likely to influence global climate sensitivity. How clouds respond to greenhouse warming on global and regional scales is still not well understood. Here we present first results from a km-scale, cloud-permitting greenhouse warming simulation conducted with the coupled OpenIFS-FESOM2 model (AWI-CM3) with ~9 km atmosphere resolution, 137 vertical levels and 4-15 km variable ocean resolution. Our analysis is based on a set of 10-year time-slice simulations, which branched off from a lower-resolution (31 km) SSP585 transient scenario run with relatively high climate sensitivity. We will quantify the effect of atmosphere resolution and cloud granularity on cloud radiative feedbacks. We will further present results from the calculation of radiative kernels to determine the role of high cloud feedbacks in polar amplification.