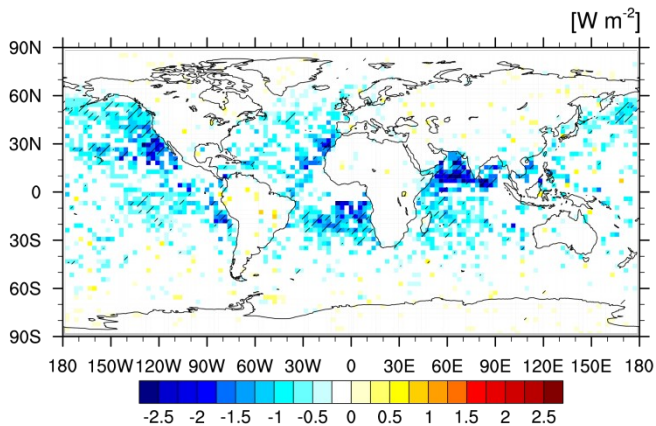


# The climate impact of biofuels in shipping

## Global model studies of the aerosol radiative forcing

M. Righi, C. Klinger, V. Eyring, J. Hendricks, A. Lauer and A. Petzold

Changes in SW cloud forcing - REF aged 2



- ✓ We generate 4 new **bottom-up** ship emission inventories
- ✓ We consider **low-sulphur fuels** (both from fossil and biogenic sources) as a replacement for standard heavy fuel oil in the current fleet
- ✓ We apply these inventories to **ECHAM/MESSy-MADE** model and perform global simulations
- ✓ MADE is coupled to the **cloud** and to the **radiation** schemes in order to simulate aerosol **radiative forcing effects**
- ✓ We analyze the climate impact of alternative fuels in shipping, focusing on global **aerosol loading**, **cloud microphysical properties** and **RF** effects.

