**Subtropical Clouds Key to Southern Ocean Teleconnection to the Tropical Pacific**

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**Introduction**

- Southern Ocean warm bias has been suggested to cause the double ITCZ bias through teleconnection based on inter-hemispheric energetics.
- Models disagree on the quantitative importance of the remote Southern Ocean contribution to the double ITCZ bias.
- We investigate the Southern Ocean-driven teleconnection mechanism and the cause for the inter-model differences in the teleconnection efficiency.

**Data and Methods**

**Extratropical-Tropical Interaction Model Inter-comparison Project (ETIN-MIP)**

- 8 fully coupled models
- Control simulation: Pre-industrial run
- Perturbed simulation: Solar insolation reduction between 45°S-65°S by 0.8 PW

**Teleconnection from Southern Ocean to Tropical Pacific**

- Southern Ocean cooling induces a triangular cold patch over the South Pacific and displaces the eastern Pacific ITCZ northward, alleviating double ITCZ problem (Fig. 1).
- Large inter-model diversity in the teleconnection efficiency (right panels of Fig. 1a,b).

**Teleconnection Mechanism**

- The delayed Southern Ocean warming in global warming scenarios would induce a similar teleconnection pattern with a reversed sign.

**Inter-model Diversity and Subtropical Cloud Feedback**

- SW cloud feedback is estimated by regressing de-seasonalized and de-trended SWCRE onto the underlying SSTs at each grid point using 100-yr monthly data of the pre-industrial control simulation (Fig. 3a).
- Models with stronger subtropical cloud feedback tend to show a larger triangular cooling and more northward eastern Pacific ITCZ shift (Figs. 3b,4a,4b).

**Summary and Discussion**

- Here, we reveal a teleconnection from Southern Ocean to the tropical Pacific that is mediated by subtropical stratocumulus cloud feedback.
- The delayed Southern Ocean warming in global warming scenarios would induce a similar teleconnection pattern with a reversed sign.