Anmeldung eines Themas für eine Masterarbeit

Topic Date	Model weighting of terrestrial carbon fluxes for the improved reproduction of atmospheric CO_2 variability 18.3.2024
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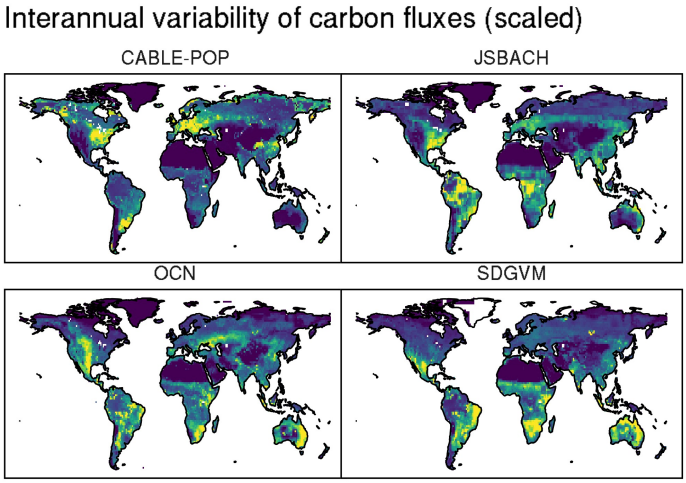
Description	 To reproduce the variability of atmospheric CO_2, an estimation of the terrestrial carbon sink is needed. One of the most reliable reproductions of the terrestrial carbon cycles is the TRENDY model ensemble. This product results from the carbon fluxes of 18 land surface models (LMs) forced with meteorological observations. However, there is high uncertainty in the spatial patterns of carbon flux variability (See figure). This means that the LMs disagree on how much individual regions contribute to the variations in atmospheric CO_2. By establishing measures for regional model performance, a weighted averaging scheme can be applied. The aims of this thesis are to a) quantify the differences in the interannual variability of carbon fluxes of the TRENDY LMs, b) calculating one or more observation-based performance metrics, and c) to perform the model weighted in order to find out whether the performance metrics are suitable to improve the reproduction of atmospheric CO_2.
Literature	1. Chen, Min, et al. "Regional contribution to variability and trends of global gross primary productivity." *Environmental Research Letters* 12.10 (2017): 105005. 2. Piao, Shilong, et al. "Interannual variation of terrestrial carbon cycle: Issues and perspectives." *Global Change Biology* 26.1 (2020): 300-318.

	3. Padrón, Ryan S., et al. "Controls of intermodel uncertainty in land carbon sink projections." *Biogeosciences Discussions* 2022 (2022): 1-20. 4. Knutti, Reto, et al. "A climate model projection weighting scheme accounting for performance and interdependence." *Geophysical Research Letters* 44.4 (2017): 1909-1918.