

EGU21-1889

<https://doi.org/10.5194/egusphere-egu21-1889>

EGU General Assembly 2021

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Robust Future Changes in Meteorological Drought in CMIP6 Projections Despite Uncertainty in Precipitation

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Understanding how climate change affects droughts guides adaptation planning in agriculture, water security, and ecosystem management. Earlier climate projections have highlighted high uncertainty in future drought projections, hindering effective planning. We use the latest CMIP6 projections and find more robust projections of meteorological drought compared to mean precipitation. We find coherent projected changes in seasonal drought duration and frequency (robust over >45% of the global land area), despite a lack of agreement across models in projected changes in mean precipitation (24% of the land area). Future drought changes are larger and more consistent in CMIP6 compared to CMIP5. We find regionalised increases and decreases in drought duration and frequency that are driven by changes in both precipitation mean and variability. Conversely, drought intensity increases over most regions but is not simulated well historically by the climate models. These more robust projections of meteorological drought in CMIP6 provide clearer direction for water resource planning and the identification of agricultural and natural ecosystems at risk.