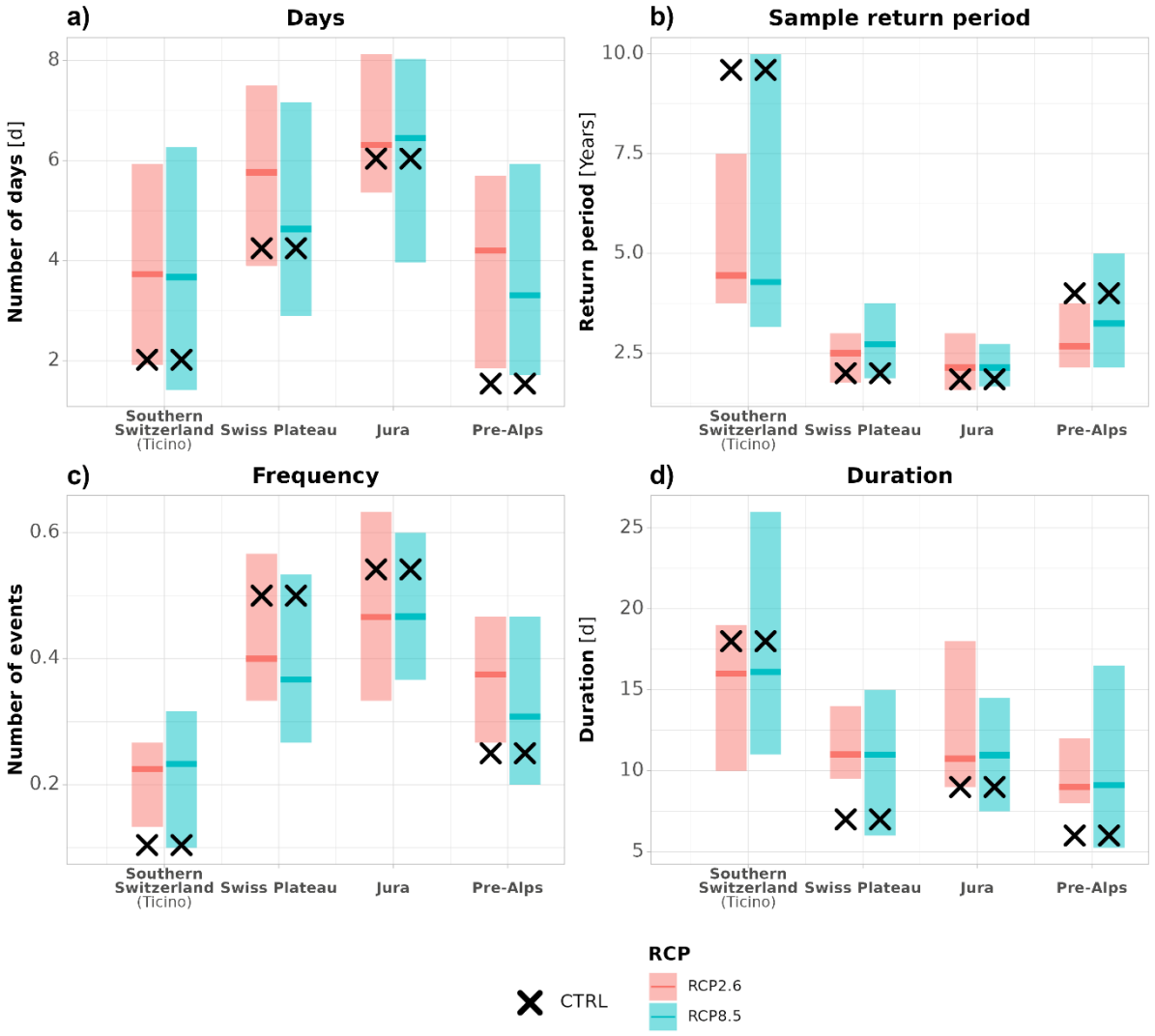

Figure S1: Validation of multivariate compound drought characteristics: (a) (Number of) Days, (b) Sample return period (events), (c) (Event) frequency, (d) (Event) duration. Colour-shading indicates the multi-model median distribution over all catchments per Greater region for the reference period (1991-2020) for RCP2.6 (reddish) and RCP8.5 (greenish) for the full range of model medians (min-max). The multi-model median is indicated by the thick (coloured) bar. Black crosses indicate the median of the CTRL-simulation.

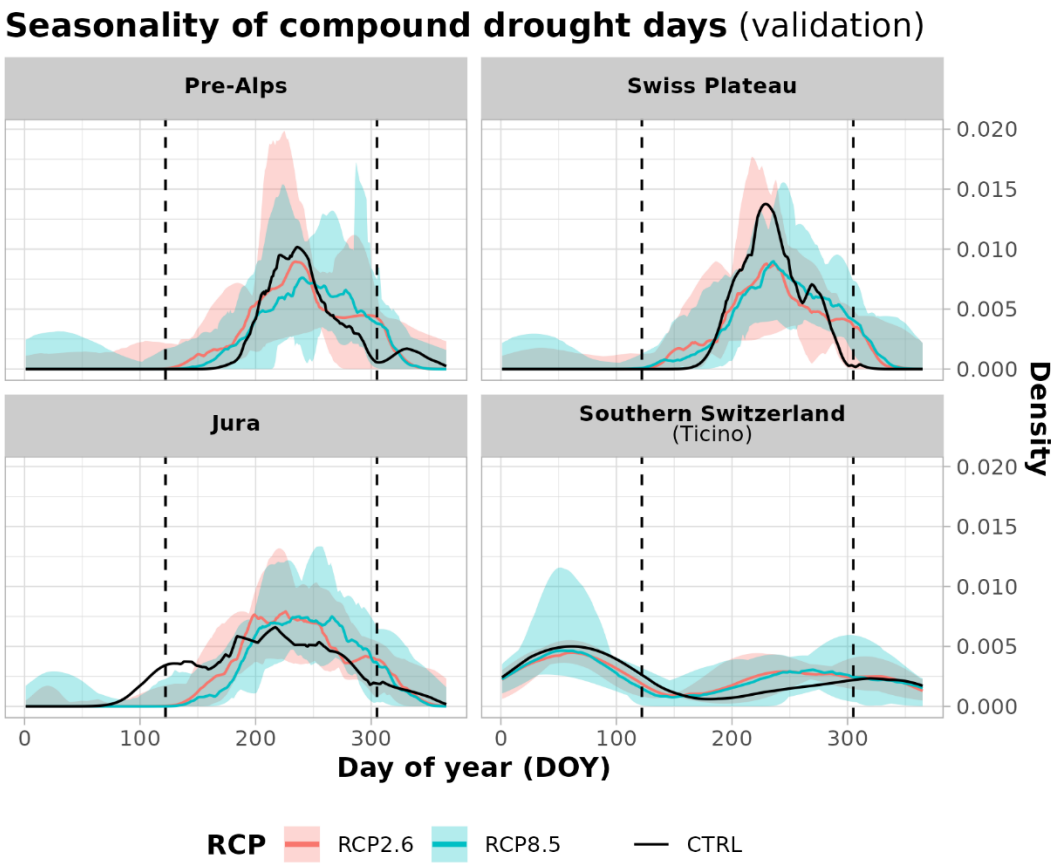

Figure S2: Validation of (multivariate) compound drought characteristics: Seasonality of compound drought days. Colour-shading indicates the multi-model median distribution over all catchments per Greater region for the reference period (1991-2020) for RCP2.6 (reddish) and RCP8.5 (greenish) for the full range over all models (min-max). The multi-model median seasonality is indicated by the (coloured) solid line. Solid black lines indicate the seasonality of compound drought days in CTRL-simulations.

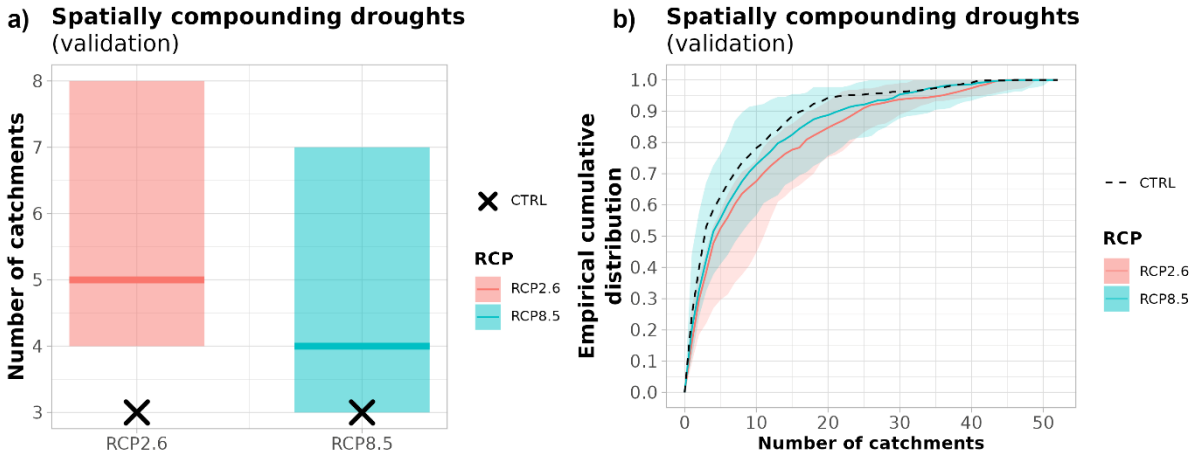

Figure S3: Validation of spatially compounding droughts: (a) multi-model median distribution of the median number of catchments simultaneously affected by (multivariate) compound drought conditions, (b) multi-model empirical cumulative distributions of spatially compounding drought days conditional on the number of catchments simultaneously affected by (multivariate) compound drought conditions. Colour-shading indicates the multi-model median distribution over all catchments for the reference period (1991-2020) for RCP2.6 (reddish) and RCP8.5 (greenish) for the full range of model medians (distributions) (min-max). The median is indicated with thicker coloured lines. The median number of simultaneously affected catchments (median of cumulative distributions) of CTRL-simulations is indicated with a black cross (dashed black line).

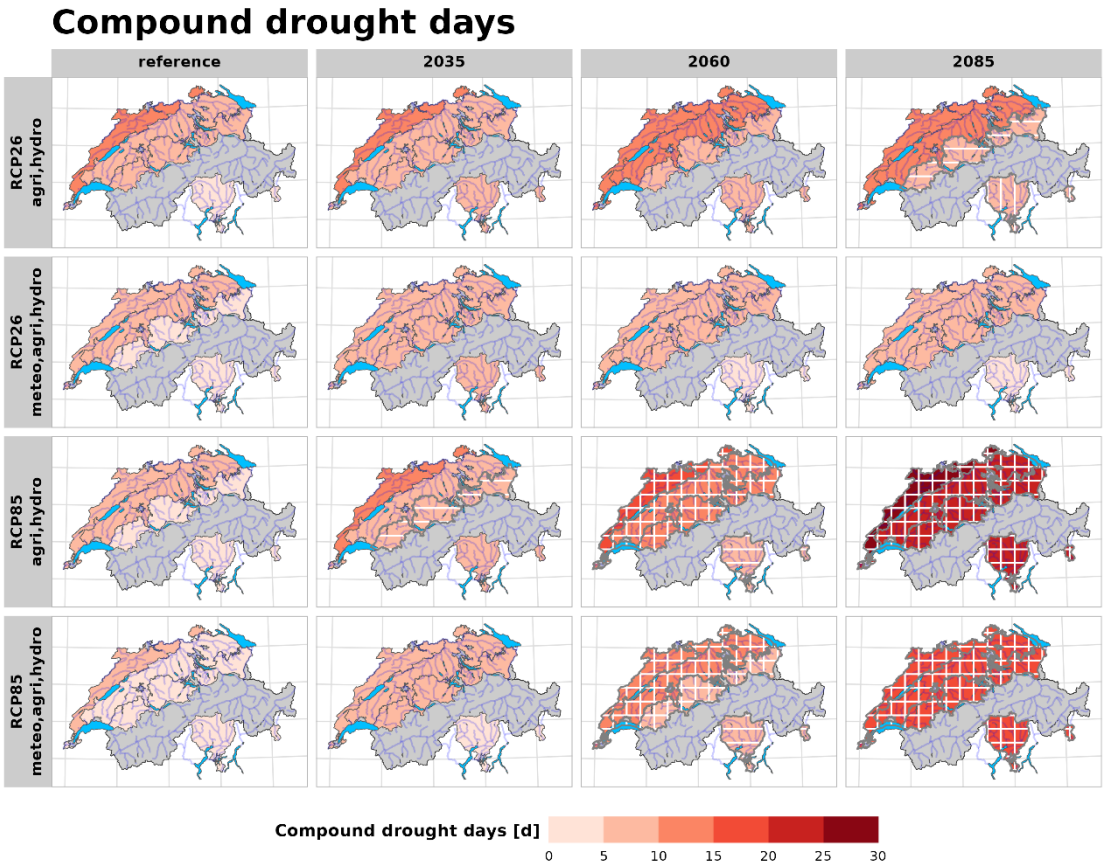

Figure S4: Compound drought days per extended summer season for the reference climate and under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).

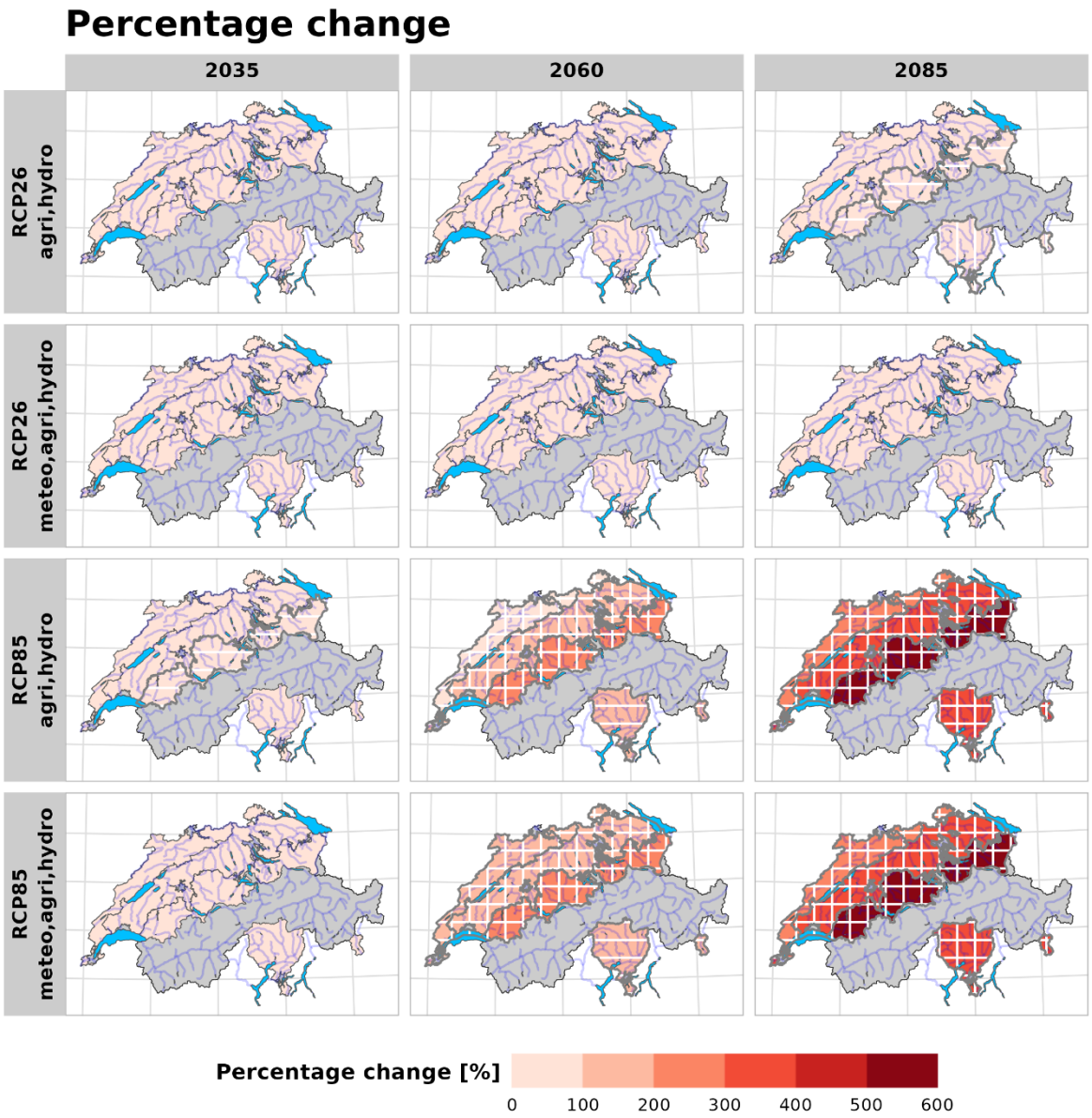

Figure S5: Percentage change in number of compound drought days per extended summer season under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value of percentage changes compared to the reference period over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).

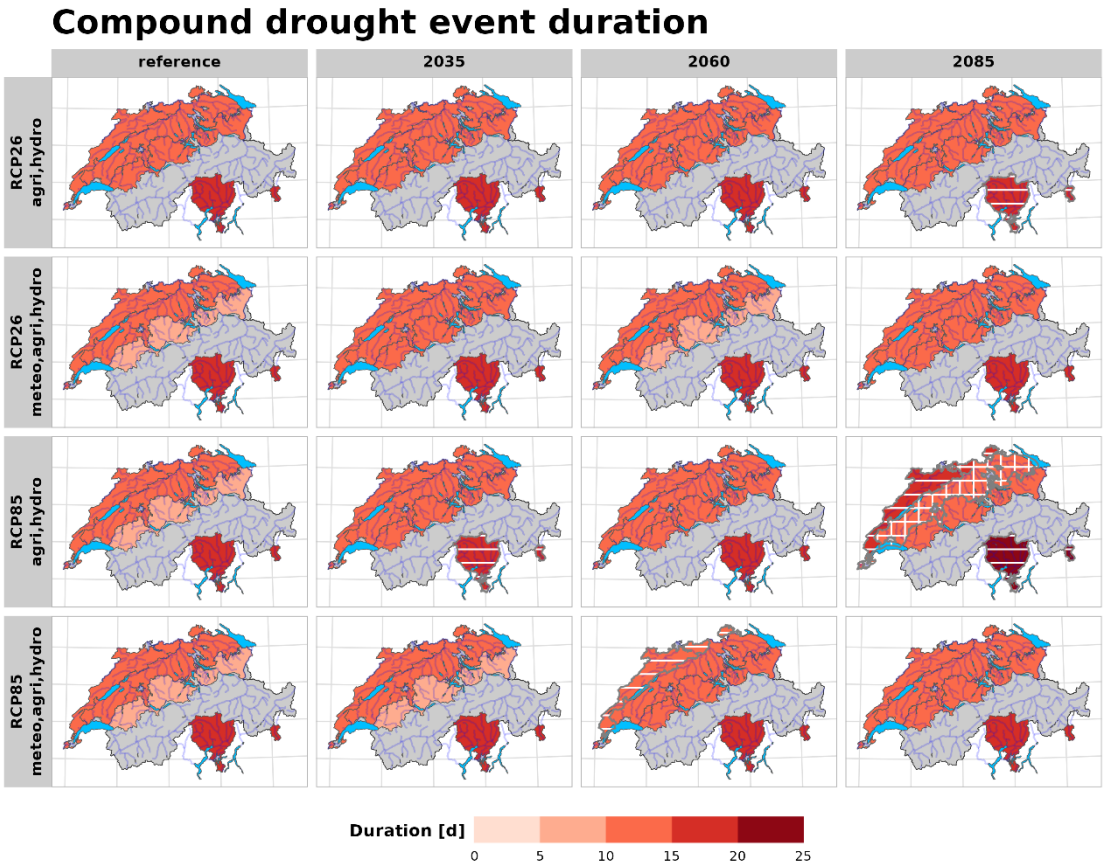

Figure S6: Compound drought event duration for the reference climate and under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).

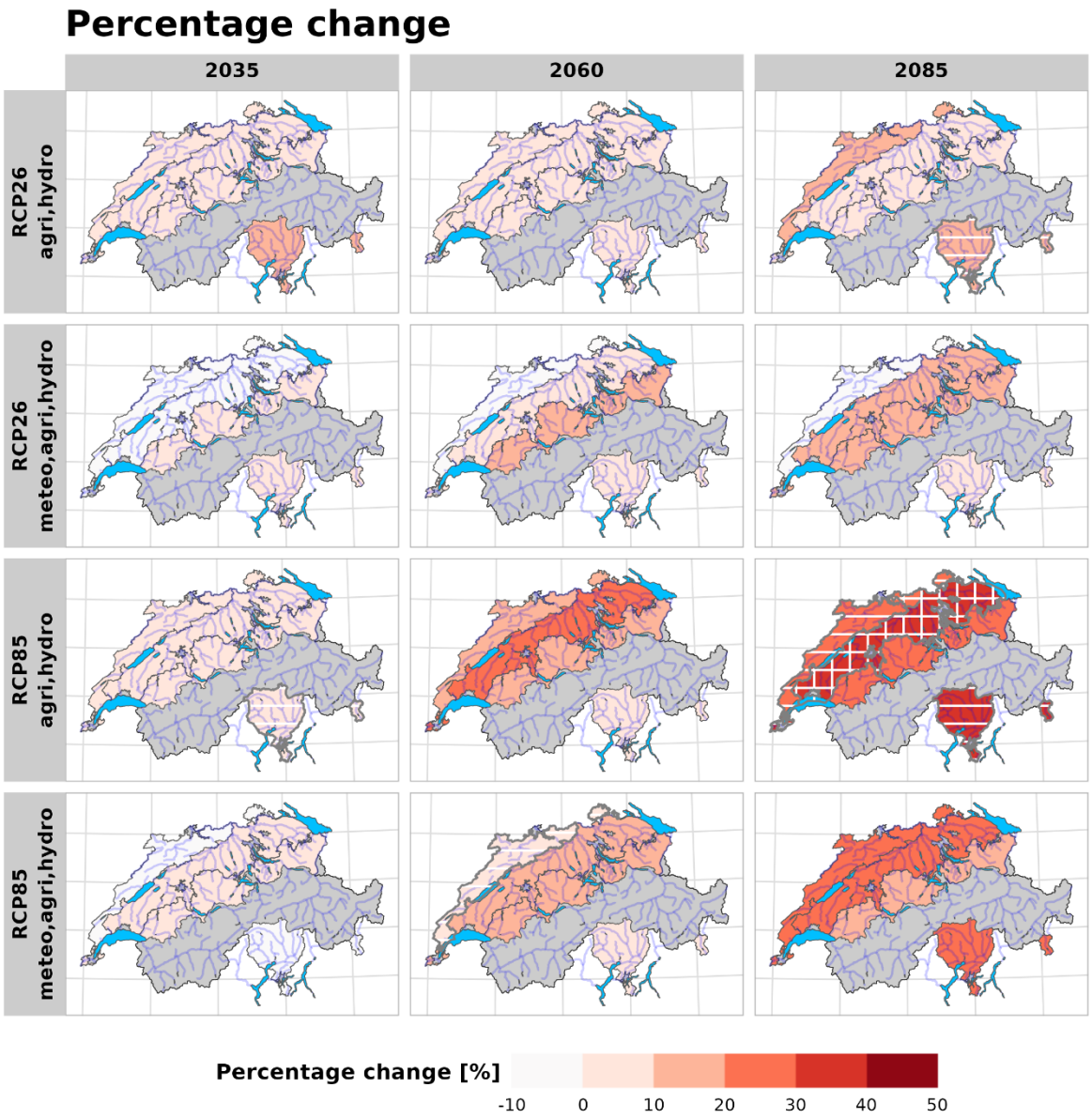

Figure S7: Percentage change in compound drought event duration under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value of percentage changes compared to the reference period over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).

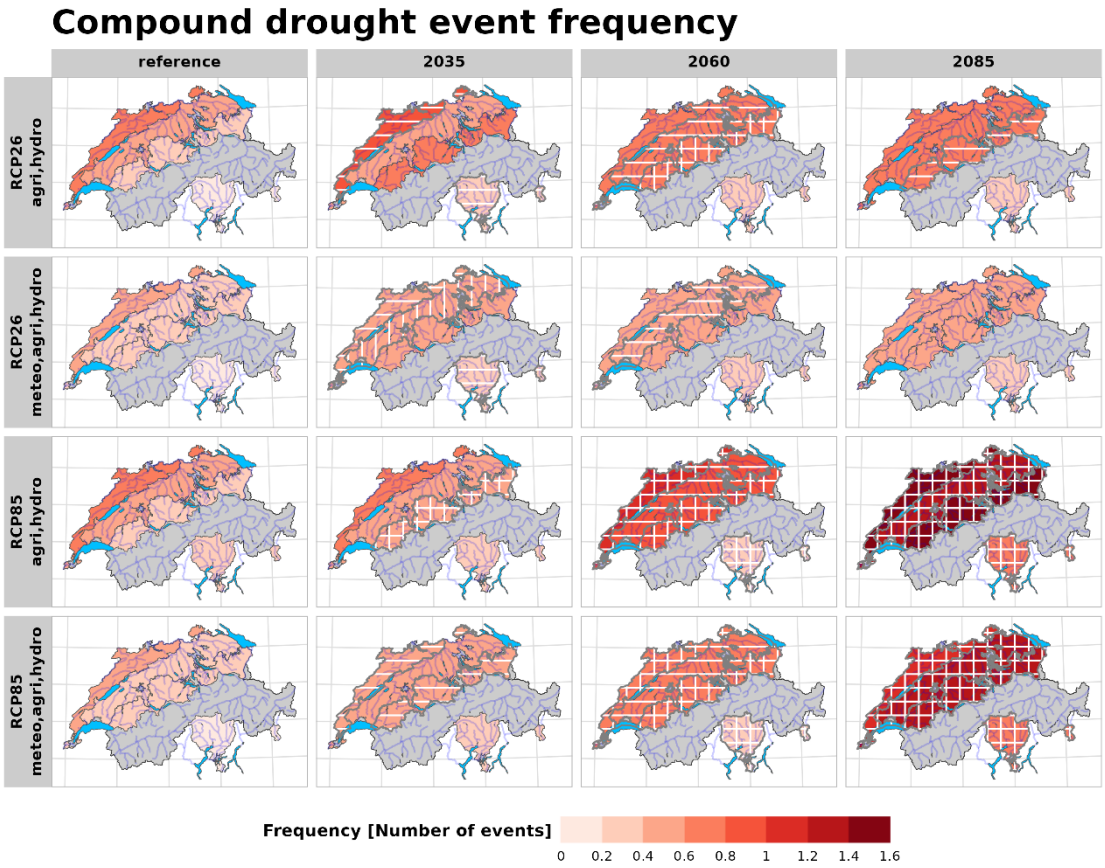

Figure S8: Compound drought event frequency for the reference climate and under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).

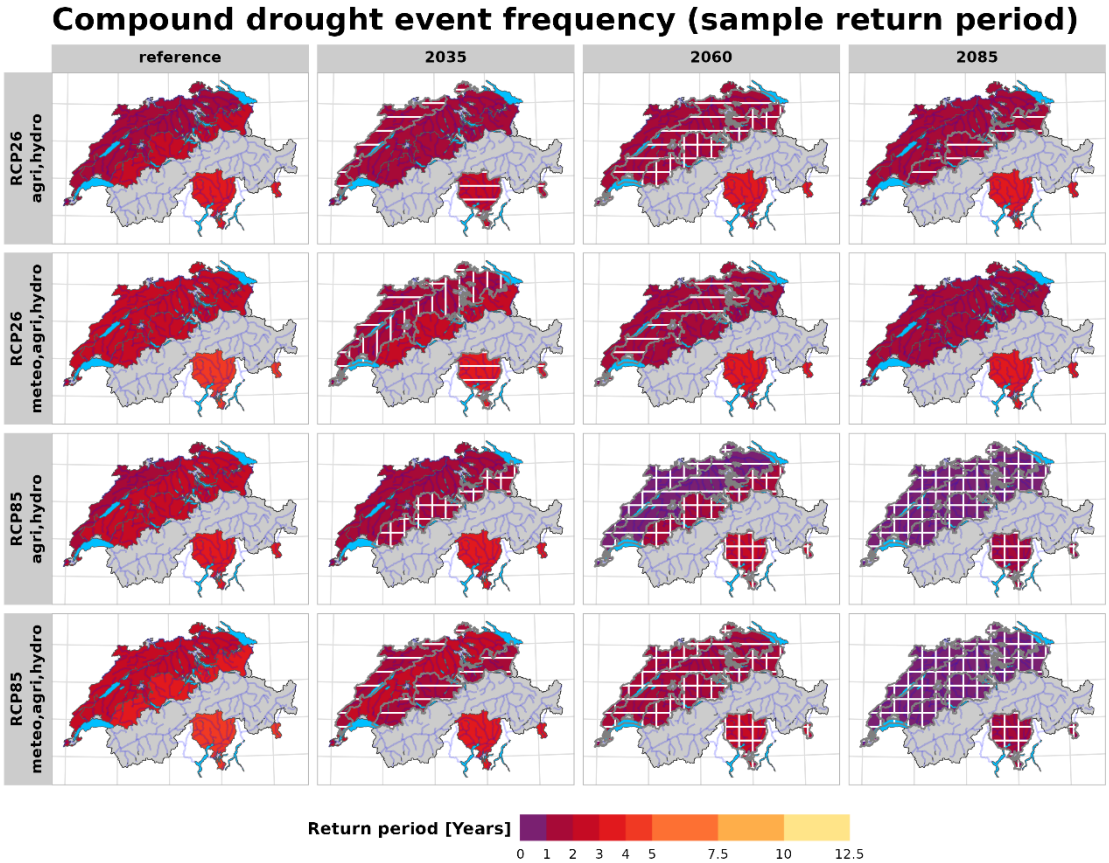

Figure S9: Compound drought event frequency (sample return period) for the reference climate and under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).

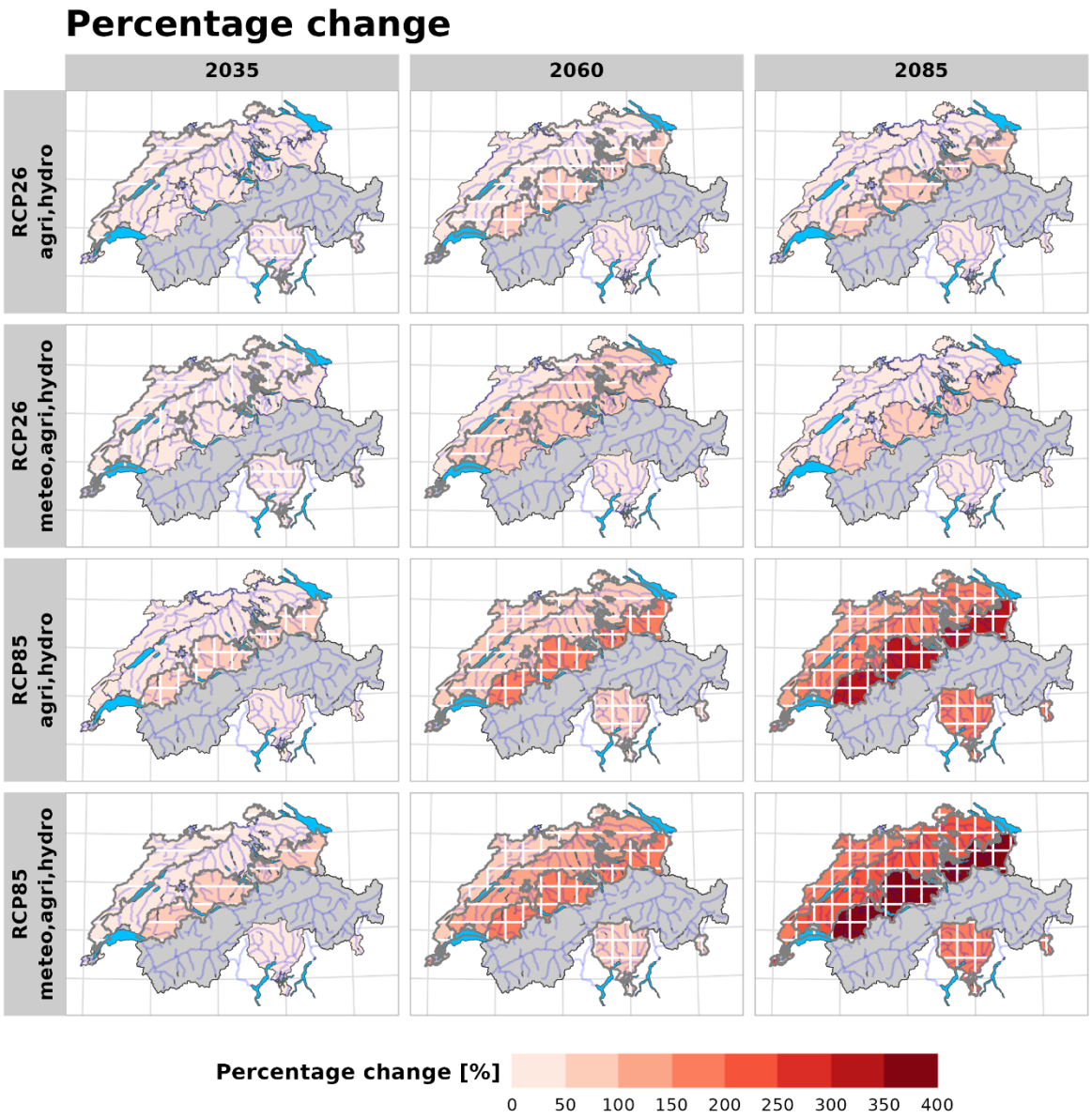

Figure S10: Percentage change in compound drought event frequency under climate change for a mitigation (RCP2.6) and non-mitigation (RCP8.5) scenario aggregated on the Greater regions (median over all catchments). Presented is the median value of percentage changes compared to the reference period over all model simulations per scenario for compounding of all drought types (meteo,agri,hydro) and compounding of agricultural and hydrological droughts (agri,hydro). Hatching indicates if changes are significant compared to the reference period (horizontal lines) and whether ≥ 90% of model simulations agree on the projected changes (per scenario; vertical lines).