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Role of soil moisture in the amplification of climate warming in the Eastern Mediterranean and Middle East

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Projections for the 21st century suggest that climate change may be associated with weather extremes in some regions (i.e. droughts, floods, heat waves), partly due to enhanced inter-annual variability. In the already warm summertime Eastern Mediterranean and Middle East (EMME) climate change may involve mechanisms and feedbacks that cause or intensify hot weather events. One type of feedback involves soil moisture – atmosphere interactions. When the soil water content and evapotranspiration are decreased, near surface air temperatures may be enhanced due to reduced evaporative cooling. In the present study, we explore this interaction by identifying sub-regions sensitive to this feedback. We apply the classical hydrology framework to define evapotranspiration regimes as a function of soil moisture and latent heat flux. Further, we use the correlation of summer temperature and evapotranspiration as a diagnostic of this coupling. Our database covers the period 1959-2099, derived from the Hadley Centre's regional climate model PRECIS, driven by the A1B emissions scenario. Finally, we discuss possible alterations of the relationship between soil moisture and surface temperature throughout the 21st century.