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Modelling historical and current irrigation water demand on the continental scale: Europe

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Abstract. Water abstractions for irrigation purposes are higher than for any other pan-European water use sector and have a large influence on river runoff regimes. This modelling experiment assesses historic and current irrigation water demands for different crops in five arc minute spatial resolution for pan-Europe. Two different modelling frameworks have been applied in this study. First, soft-coupling the dynamic vegetation model LPJmL with the land use model LandSHIFT leads to overestimations of national irrigation water demands, which are rather high in the southern Mediterranean countries. This can be explained by unlimited water supply in the model structure and illegal or not gauged water abstractions in the reported data sets. The second modelling framework is WaterGAP3, which has an integrated conceptual crop specific irrigation module. Irrigation water requirements as modelled with WaterGAP3 feature a more realistic representation of pan-European water withdrawals. However, in colder humid regions, irrigation water demands are often underestimated. Additionally, a national database on crop-specific irrigated area and water withdrawal for all 42 countries within pan-Europe has been set up and integrated in both model frameworks.

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