

(a) Temperature datasets used as input data for temperature-based PET equations. Multiple versions were used to investigate the effect of temporal distribution of the data on output PET estimation				
Dataset short name	Resolution	Description	Comment	
CHESS-temp daily	1 km × 1 km Daily	CHESS-met high-resolution mean daily temperature: part of a larger dataset developed by CEH for environment modelling applications, available for 1961–2015	“Best” available gridded daily temperature data for Great Britain	
CHESS-temp clim	1 km × 1 km Daily	CHESS daily mean temperature climatology: long-term average (1961–1990) of daily mean temperature, derived from CHESS-temp daily	Default option that could be used even if no temperature data were available	
CHESS-temp monthly I	1 km × 1 km Monthly disaggregated to daily	CHESS daily mean temperature derived from monthly averages, constant during the month. Step changes in temperature between consecutive months	To investigate whether temporal disaggregation method (from monthly to daily) has an effect on output PET estimation	
CHESS-temp monthly II	1 km × 1 km Monthly disaggregated to daily	CHESS daily mean temperature derived from monthly averages, interpolated using pchip		
CHESS-temp monthly III	1 km × 1 km Monthly disaggregated to daily	CHESS daily mean temperature derived from monthly averages, disaggregated to daily using CHESS-temp clim pattern		
(b) Temperature datasets used to assess spatial resolution for the best performing PET method				
Dataset short name	Resolution	Description	Comment	
UKCP09-temp monthly I	5 km × 5 km Monthly disaggregated to daily	UKCP09 daily mean temperature derived from monthly averages, constant during the month	Two temporal disaggregation methods tested.	
UKCP09-temp monthly II	5 km × 5 km Monthly disaggregated to daily	UKCP09 daily mean temperature derived from monthly averages, interpolated using pchip		
(c) PET datasets used to calibrate the equations and assess the output PET				
Dataset short name	Resolution	Description	Use	
CHESS-PM	1 km × 1 km Daily and monthly	CHESS-PET 1 km grids, daily (and monthly) time series available for 1961–2015, calculated using the Penman–Monteith (PM) equation for FAO-defined well-watered grass	(1) calibration of the temperature-based PET equations (1961–1990) (2) Evaluation of the equations (1991–2012) (3) Evaluation of the final gridded product (1991–2012)	
CHESS-PM climatology	1 km × 1 km Daily and monthly	Daily (and monthly) PET long-term average, calculated from CHESS-PM for 1961 to 1990	used as a “naïve method” against which the PET reconstruction methodology can be tested to assess performance	