	Objective	Input data	Method	Calibration and evaluation data	Output
Stage 1: calibration	Calibrate temperature-based PET equations: • Blaney–Criddle • McGuinness–Bordne • Hamon • Kharrufa • MOHYSE* • Oudin* • Thornthwaite*	 CHESS temperature input data (1 km gridded) 1. Daily observed 2. Daily climatology 3. Daily disaggregated from monthly: 1. Uniform II. Smoothed III. Corrected to daily climatology 	Calibration strategies: • no calibration • monthly, per catchment • monthly, national • annual, per catchment • annual, national	Data used for calibration: CHESS-PM daily (1961–1990)	Set of 43 catchment PET time series to be evaluated
Stage 2: evaluation	Select best combination from Stage 1: (a) equation (b) calibration strategy (c) input temperature data	Set of catchment PET time series produced in stage 1	Performance metrics : • Nash–Sutcliffe efficiency (NSE) • mean absolute percent error (MAPE)	"Ground truth" data: CHESS-PM daily (1991– 2012) "Naïve benchmark" data: CHESS-PM climatology (1961– 1990)	Best combination selected: (a) equation: McGuinness–Bordne (b) calibration strategy: annual, national (c) input temperature data: any temperature
Stage 3: effect of spatial resolution	Evaluate the effect of spatial resolution on selected method from stage 2	UKCP09 temperature input data (5 km gridded) Daily disaggregated from monthly: I. Smoothed II. Corrected to daily climatology	 Calculate PET using 5 km input temperature data Performance metrics used for evaluation: NSE MAPE 	"Ground truth" data: CHESS-PM daily (1991–2012) "Naïve benchmark" data: CHESS-PM climatology (1961– 1990)	Final combination selected: (a) equation: McGuinness-Bordne (b) calibration strategy: Annual, national (c) input temperature data: UKCP09 Daily disaggregated from monthly (smoothed)
Stage 4: effect of catchment averaging	Check if it makes a difference to: (i) derive catchment PET by averaging gridded PET over a catchment, or (ii) apply same equation to catchment averaged temperature to derive catchment PET	PET method determined from stage 3	Calculate correlation coefficient (r)	PET derived from catchment averaged temperature data, using selected PET equation	Averaging over the catchment before or after applying the PET equation makes virtually no difference
Stage 5: final evaluation	Evaluate the PET data from stage 4	Catchment averaged and gridded PET products from stage 4	Performance metrics: • R • MAPE • NSE • β • VR • KGE	 "Ground truth" data: CHESS-PM daily (1991–2012) Catchment averaged Regridded at 5 km 	Final validated PET products