

# Available performance criteria

Performance criteria that can be chosen as objective function for calibration in [info.txt](#). The criteria are calculated for the model domain, based on performances at individual subbasins where observations exists. Four kinds of combination of the individual subbasins are used:

- **average/median:** criteria calculated in subbasins individually, and then combined (equal weight to each station, irrespective of time series length)
- **regional:** criteria calculated on a combined long time series over all subbasins (thus weighted by data lengths)
- **spatial:** time series at each subbasin is collapsed to a single long-term average, these averages are then combined to a “spatial series” over all subbasins, and the criteria calculated over those
- **weighted average:** criteria calculated in subbasins individually, and then combined as an weighted average with different weight (based on trust) to each station. The use of weighted average instead of arithmetic average is decided by a flag in [info.txt](#) (`weightsub`).

Available performance criteria for domain-wide model evaluation are listed in the table below. The following criteria will use weighted average in case of flag set for weighted subbasins; MR2, MRA, MRE, MRS, MCC, AKG, MNW, ASK, TAU, and MAR. Equation definitions for criteria calculation are described [here](#).

**Note:** Kling-Gupta efficiency criteria can only be used on positive variables.

**Note:** As described in [info.txt](#), up to 100 performance criteria can be combined for model evaluation. However, for HYPE-internal computational reasons, **criteria TAU, MRA, RRA, and SRA criteria must be defined as one of the first four criteria in info.txt** (e.g. as `crit 1 criterion MRA`).

Criterion ID	Description	Equation ID
MR2	average of Nash-Sutcliffe efficiency for all subbasins with observations.	AVNSE
MRE	average of the relative bias for all subbasins (Note: fraction, not %).	AVRB
MRA	average value of subbasin values of efficiency (RA) similar to Nash-Sutcliffe with coefficient $a$ instead of a square.	AVRA
MCC	Pearson correlation coefficient, average of all subbasins with observations.	AVCC
MRS	error in standard deviation, average of all subbasins with observations.	AVRSB
MAR	average of absolute relative bias for all subbasins (Note: fraction, not %).	AVARB
MNW	average of Nash-Sutcliffe efficiency adjusted for bias for all subbasins with observations.	AVNSEW
AKG	average of Kling-Gupta efficiency for all subbasins with observations.	AVKGE
ASK	average of rescaled Kling-Gupta efficiency for all subbasins with observations.	ASCKGE
RR2	regional Nash-Sutcliffe efficiency (all data combined in one long time series).	REGNSE
RRE	regional relative bias (all data combined in one long time series).	REGRB
RRA	regional efficiency similar to Nash-Sutcliffe with coefficient $a$ instead of a square.	REGRA
MD2	median of Nash-Sutcliffe efficiency for all subbasins with observations.	MEDNSE

Criterion ID	Description	Equation ID
MDA	median of all subbasins' RA (efficiency similar to Nash-Sutcliffe with coefficient $a$ instead of a square).	<i>MEDRA</i>
MKG	median of all subbasins' Kling-Gupta efficiency.	<i>MEDKGE</i>
MNR	median of all subbasins' normalised RMSE.	<i>MEDNE</i>
SR2	spatial Nash-Sutcliffe efficiency calculated using annual means for all subbasins (requires at least 5 years and 5 subbasins with data) to calculate the Nash-Sutcliffe efficiency.	<i>SPATNSE</i>
SRA	Spatial efficiency similar to Nash-Sutcliffe with coefficient $a$ instead of a square.	<i>SPATRA</i>
SNR	Spatial RMSE.	<i>SPATRMSE</i>
SMB	Spatial mean absolute scaled bias on log transformed values.	<i>SPATASB</i>
TAU	average of Kendall's rank correlation coefficient (Tau) value for all subbasins.	<i>AVTAU</i>