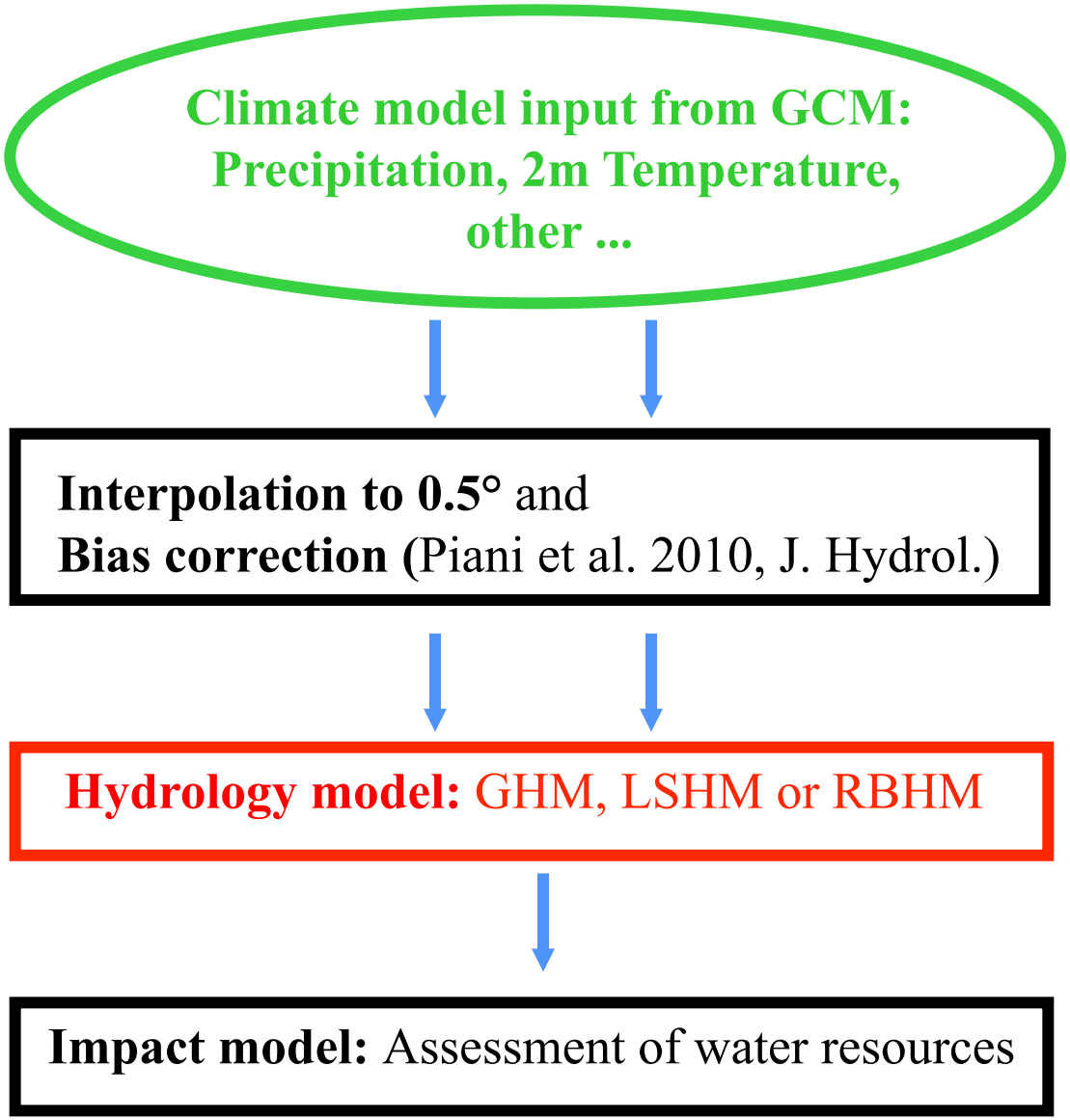
Global modelling chain in WATCH, WaterMIP (Haddeland et al. 2011)



Observations:
WATCH forcing data (WFD; Weedon et al. 2011, JHM)

First application to 3 GCMs: Hagemann et al. 2011, JHM

Change in global water resources
(8 GHMs & 3 GCMs):
Hagemann et al., in prep.

Bias correction characteristics

Requirements

- Bias correction should be applied to GCM data
- As large scale extremes shall also be considered, a simple correction of the mean values is not sufficient.
- Bias correction is required that corrects the whole distribution.

Main Assumptions

- Quality of observational datasets limits the quality of the bias correction.
- Bias behaviour of the model does not change with time, i.e. the transfer functions are time-independent and, thus, applicable in the future.
- Limitation: Temporal errors of major circulation systems can not be corrected, e.g. onset of monsoon.

Summary

- Bias correction affects the climate change (CC) signal but it is difficult to judge whether this leads to a more realistic CC signal or not.
- Results of Giorgi and Coppola (2010) suggests at least for precipitation that a bias correction impact on the CC signal may be reasonable.
- How to handle and possibly reduce the uncovered uncertainty will be subject to future investigations whose outcomes have to be communicated to the impact research communities.

NOTE

- Precipitation and temperature are correctly independently.
  → 2-dimensional bias correction; Piani and Haerter (2012, GRL)
- Other GCM variables are not corrected.
- Bias correction uses mathematical/statistical methods
  -> No black magic
- It is improving but also impacting climate model results, so that it should also be taken with care.