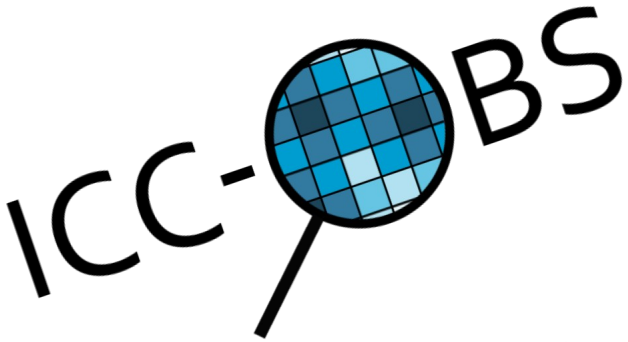
CLIMA PROOF

University of Natural Resources and Life Sciences, Vienna
Department of Water, Atmosphere and Environment

WITH FUNDING FROM
AUSTRIAN DEVELOPMENT COOPERATION

The ICC-OBS Tool



UN environment

National Workshops

June 2019

Maria Wind, Kristofer Hasel, Igor Skoric

The ICC-OBS Tool

Improving bias-corrected **C**limate **C**hange scenarios with local **OBS**ervational data

- Integration of additional local observations
- Further improvement of the climate change scenarios (better bias correction with better observational data)
- Application for sub-regions (e.g river catchment areas)

The ICC-OBS Tool

WHY DO I NEED THE TOOL?

- On the small scale available gridded observations often do not represent the reality
- Access to better data or stationdata is difficult or expensive
- Some have stationdata but don’t want or are not allowed to hand it out freely
- ICC-OBS gives the opportunity to integrate stationdata to the climate model scenarios

The ICC-OBS Tool

WHAT DO I NEED, TO RUN THE ICC-OBS TOOL?

- Climate Model Data (not bias corrected)
- Gridded Observations

  → The gridded observations and the climate model data have to be **on the same grid** and **same resolution**!

- **Stationdata (high quality)**

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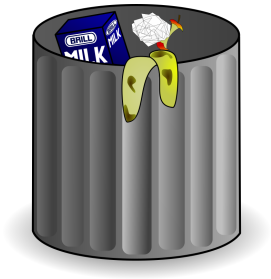
WHAT KIND OF STATIONDATA IS NEEDED?

garbage in → garbage out



- At least 10 years of daily data – ideally 30 years (1981-2010)
- The more stations, the better
  - Running the tool for just one station is not useful or can even worsen the result!
- Good quality of the stationdata is important!

THE ICC-OBS TOOL

Steps to the improved model data

1) Download **original** model data and gridded observations from the data server
2) Download and install the ICC-OBS Tool
3) Run the Tool
    1) Selection of the domain for calculations
    2) Merging stationdata with gridded observations
    3) Run bias correction algorithm
4) Be happy with your improved model data

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The ICC-OBS Tool

1. Selection of the domain

- The tool is made for small domains
  - The bigger the domain, the longer the computations take
  - The computations need a lot of memory!
- Select only an area where you have observations

The ICC-OBS Tool

2. Merging stationdata with gridded observations

1) Remove height dependency from data (monthly mean height gradient calculated from station data) *
2) Interpolation of the gridded observations to the stations (bilinear interpolation)
3) Calculating residuals at the stations
4) Interpolating the residuals to the grid
   - Inverse Distance Weights interpolation or
   - Ordinary Kriging
5) Add height dependency back to data *
6) Merge the original gridded observations with the interpolated residuals

* not for precipitation

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Interpolation settings

In the “Advanced” tab of the tool you can modify the interpolation settings:

Subsettings for IDW:

- Radius of influence (in km)
- Minimum number of neighbours

Subsettings for kriging:

- Variogram model: exponential, gaussian, linear or spherical

→ default settings pr: kriging with guassian vm

→ default settings all other parameters: idw, min. 3 neighbours, average distance between the stations as radius of influence

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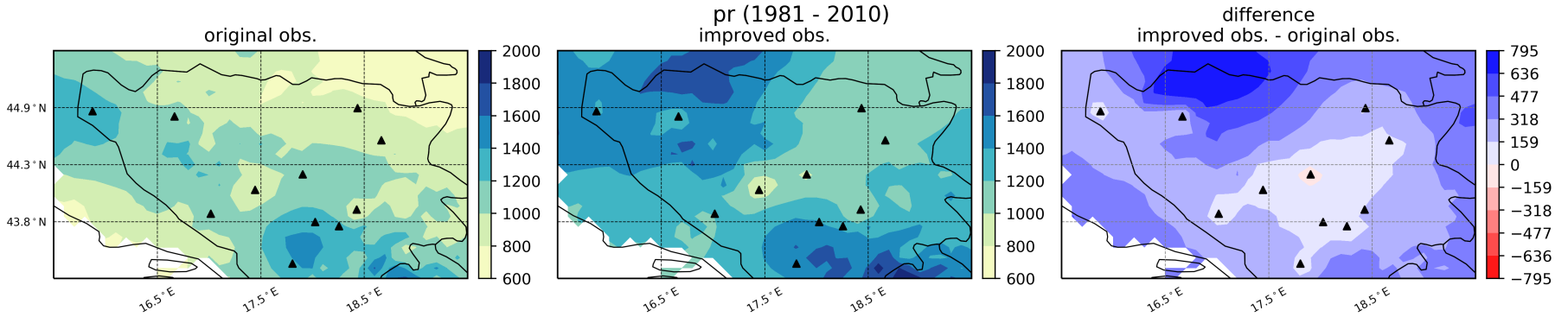
3. Bias correction of model data with the new observational dataset

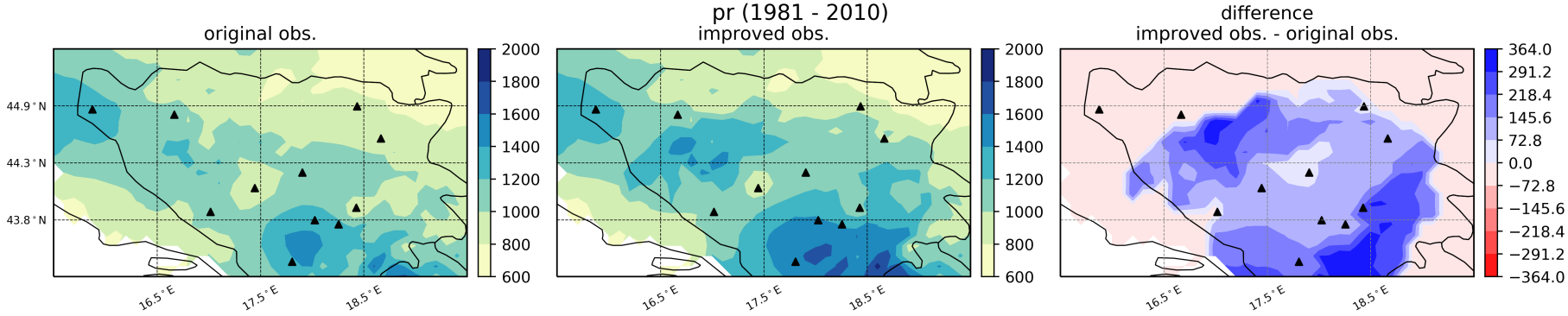
- Scaled distribution mapping (Switanek et al., 2017)
  - Same method used for bias correction of the CORDEX models
  - Implemented to correct 30-year periods with a 10-year sliding window
- Correction of each grid point
  - Result: Bias corrected grid point time series
- Final step: reordering the grid point series to get a 2-dimensional field

Casestudy BIH

11 Stations in the period 1981-2010 (precipitation)



Top: interpolation with kriging (gaussian variogram model)
Bottom: interpolation with idw (min. 3 neighbours, 100 km radius)



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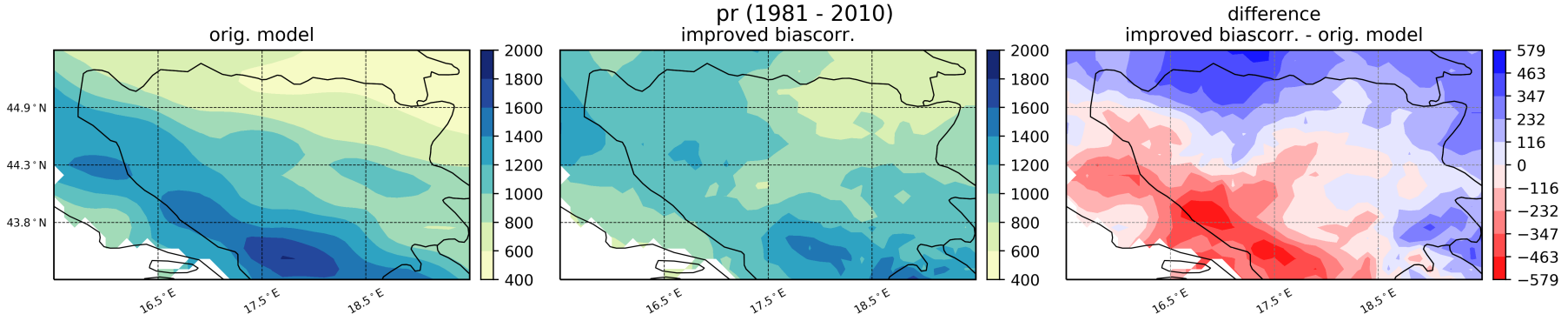
Resulting bias corrected model data



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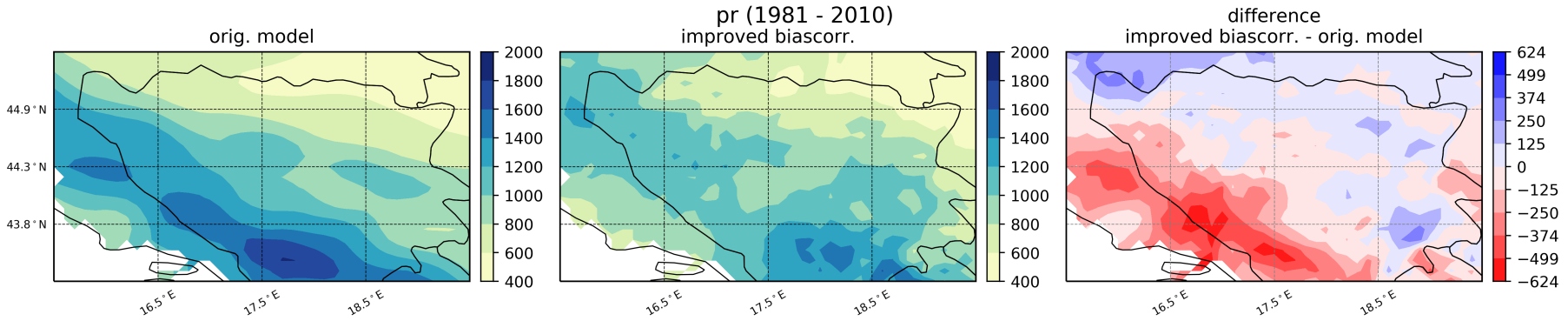

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Important notes on the tool

- The tool is in it’s beta phase (V0.1)
  - There may be still some bugs
  - GUI is basic but working – some additional features may be implemented in the future

- Suggestions and feedback are very welcome!

The ICC-OBS Tool

Follow the instructions in the User Guide to set up and try out the Tool!

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