

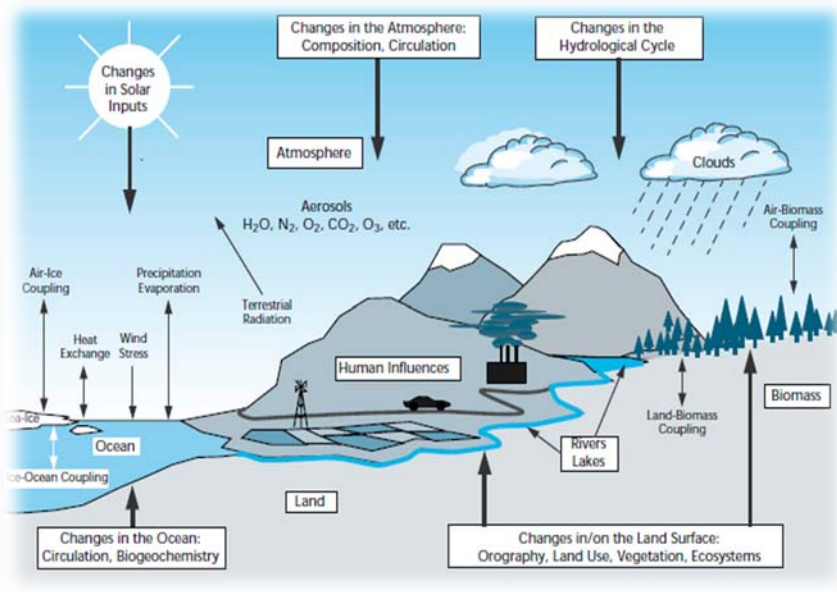
# Regional climate projections for the Western Ukraine

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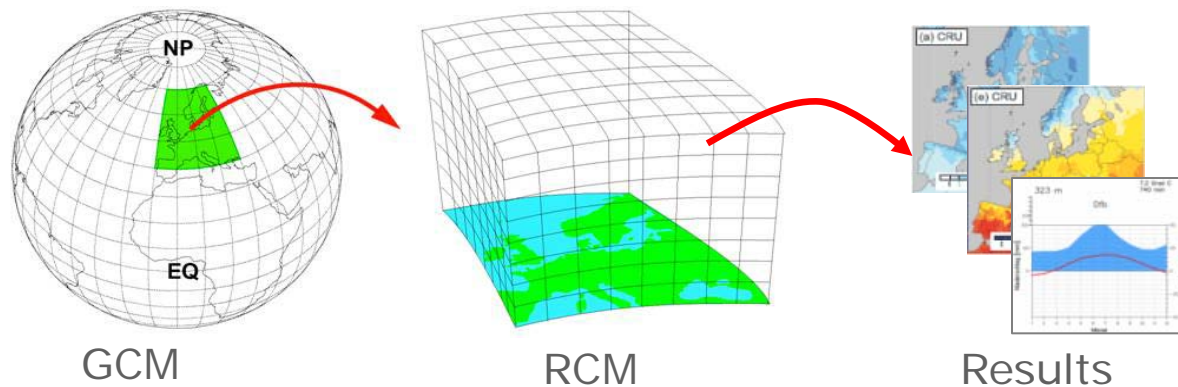


(Source: IPCC 1997)

- The climate system is close connected to the water cycle, vegetation, soil, landuse and the human environment.
- All spheres of our environment are influenced by climate change.
- Analysis of the recent climate and possible changes in future are preconditions for IWRM.
- Future climate change can only be estimated with a climate model.

# Regional Climate Modelling

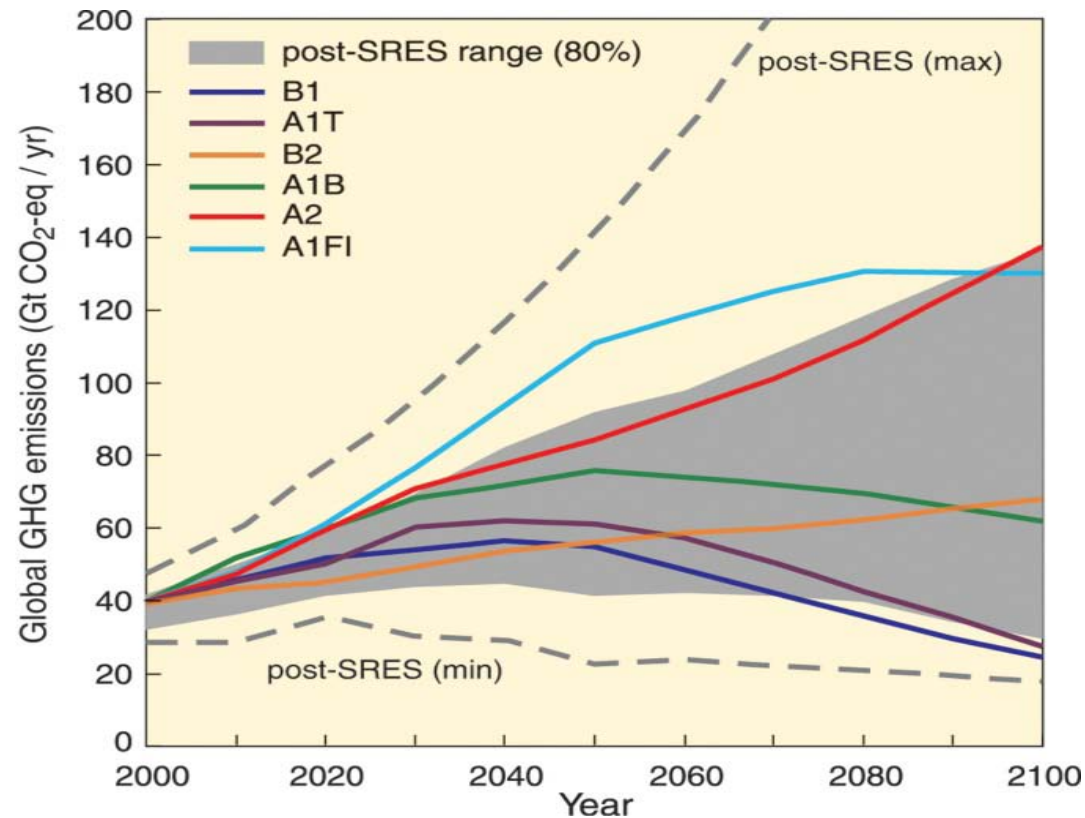
- Is based on Dynamical Downscaling → obtain regional-scale climate conditions from global-scale atmospheric variables that are provided by Global Circulation Models (GCMs).
- Embedding (nesting) of a grid with a finer spatial resolution into the coarse grid of a GCM.
- The results of the GCM serve as forcing at the boundaries of the regional grid.
- Using external parameters (orography, soil, vegetation...) with a higher spatial resolution in the area of interest.
- Parameterizations and physical equations are adapted to the atmospheric processes on the regional scale.





## Dynamical Downscaling of global climate projections (7km spatial resolution)

- Global Model: ECHAM 5 (forcing)
- Regional Model: COSMO – CLM (CCLM)
- IPCC-Scenarios: B1, A2
- Time periods: 1961-1990, 2021-2050, 2071-2100

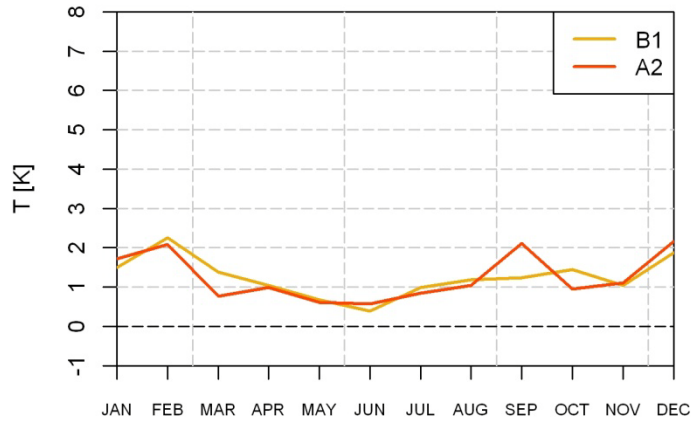


Source: AR4 (IPCC 2007)

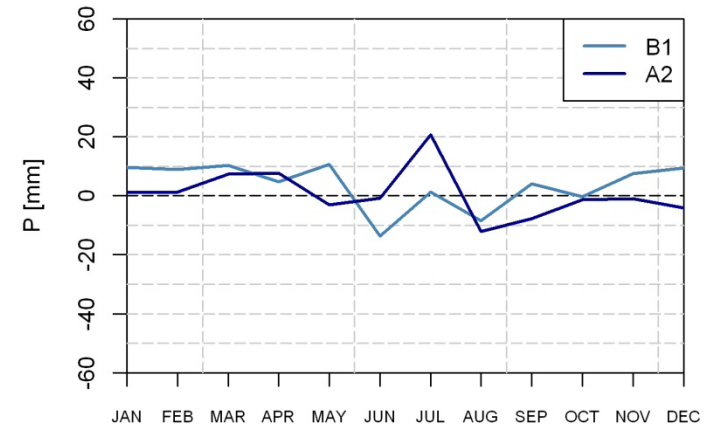
# Results – climatic changes

2021-2050

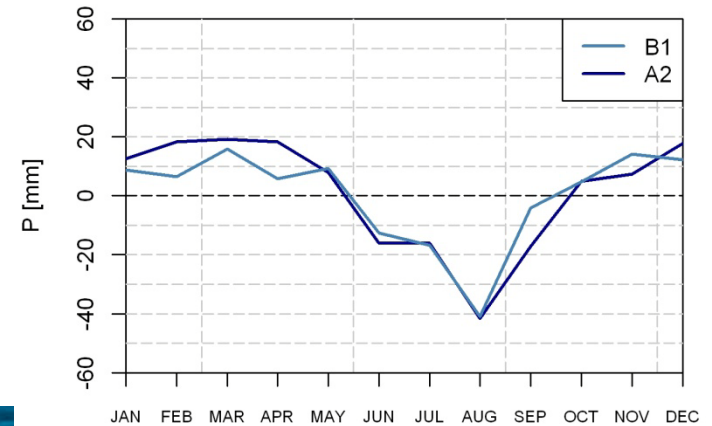
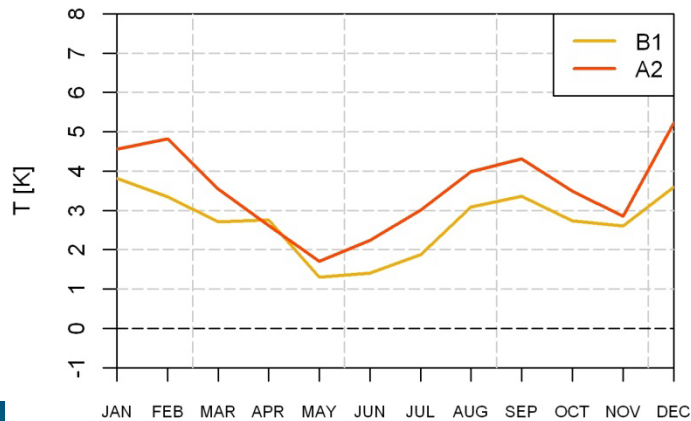
## Temperature



## Precipitation



2071-2100

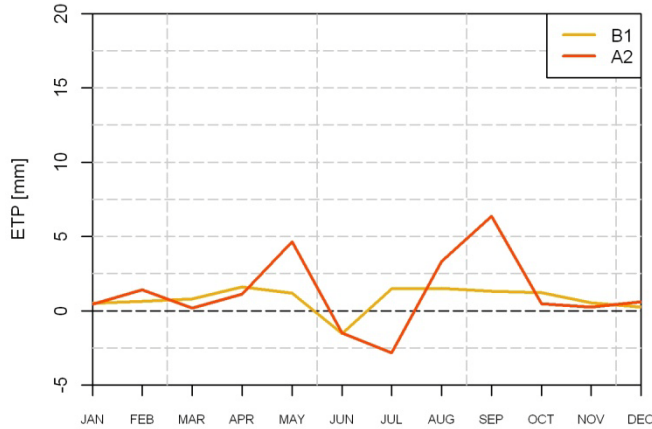




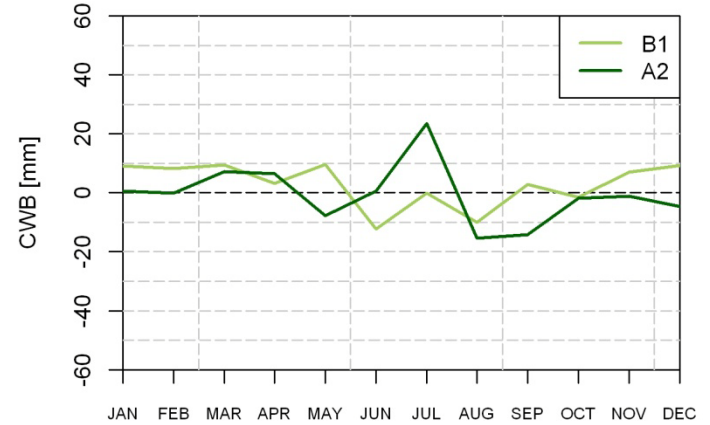
# Results – climatic changes

2021-2050

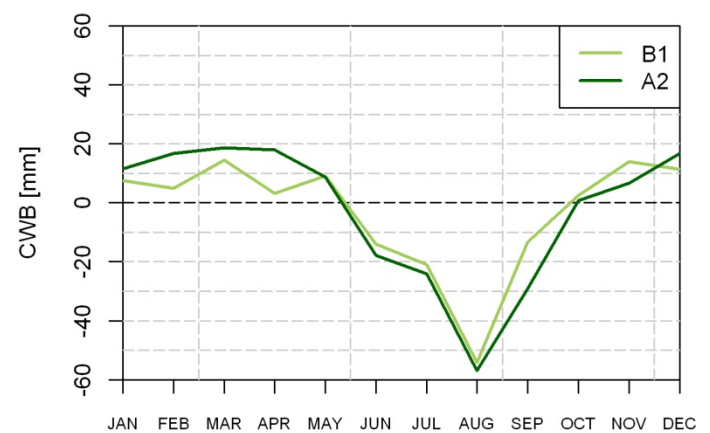
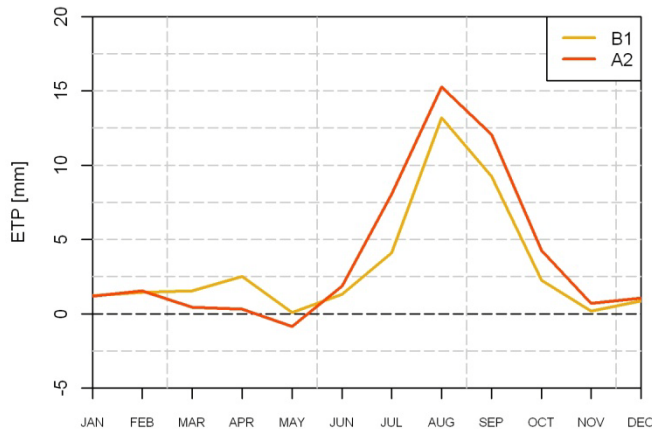
## Potential Evaporation



## Climatic Water Balance

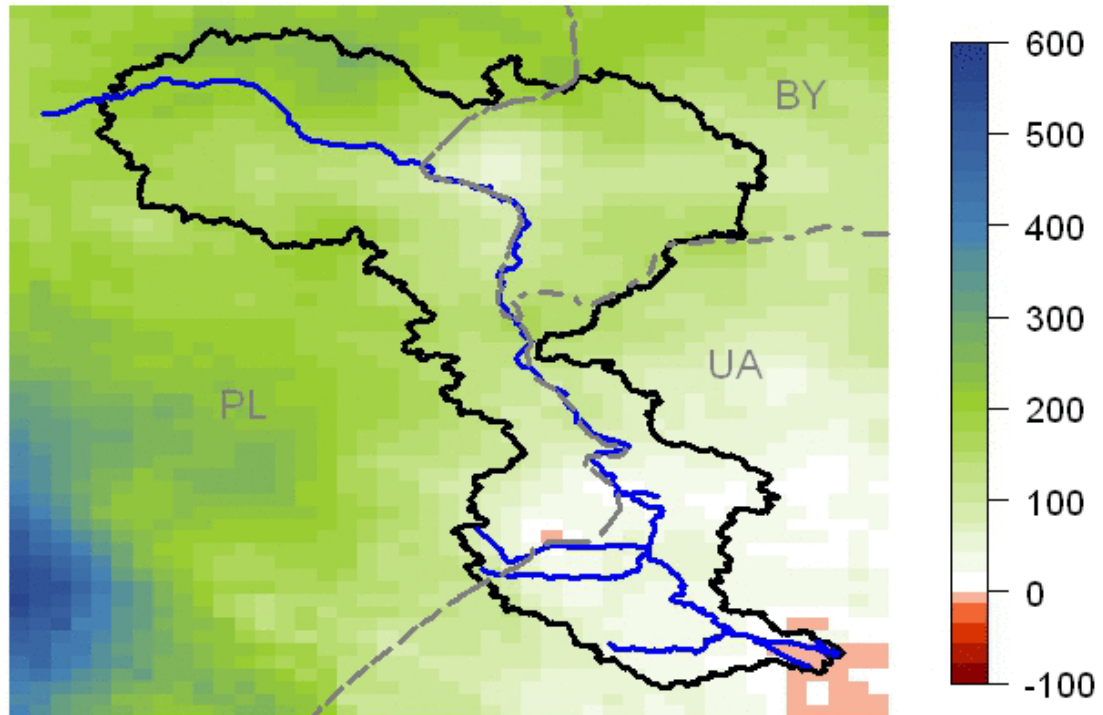


2071-2100





**climatic water balance, A2  
moving average (2011 - 2040)**



# Summary and Conclusion

- Positive temperature changes occur in every month and will be intensified up to the end of the century. Strongest temperature increase occurs in winter months.
- There are no clear changes of long-term mean precipitation sums. But, the inner annual distribution changes → decrease in summer and increase in winter.
- Model results show a clear decrease of the climatic water balance in summer months and an increase in winter months.
- The surplus of precipitation in winter can not compensate the deficit of the climatic water balance in summer (mainly for the southern part of the basin).
- Expected effects in the basin: decreasing discharges, decrease of soil water storage and ground water formation, change of hydrologic pattern, increasing pollutant concentrations.



# Thank you for your attention!

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