

Data and models

- **Measured** by Eddy-Covariance (gapfilled, corrected for energy balance closure gap)
- **SVAT** simulated by SVAT-CN (1-dimensional SVAT-model, Falge et al. 2005)
- **ML**: inferred by machine learning (Körner et al. 2018)
Predictors: Tair, rH, Rn, soil moisture, LAI, P
- daily data of 11 years (2008 – 2018)

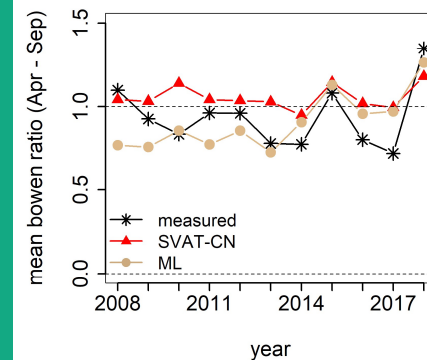
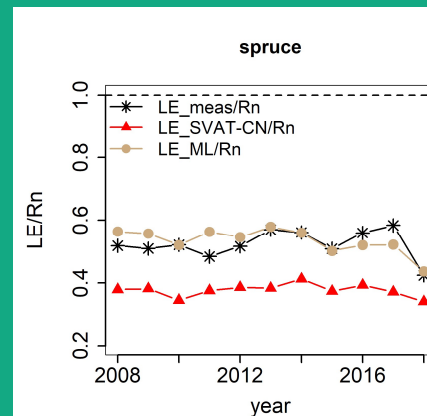
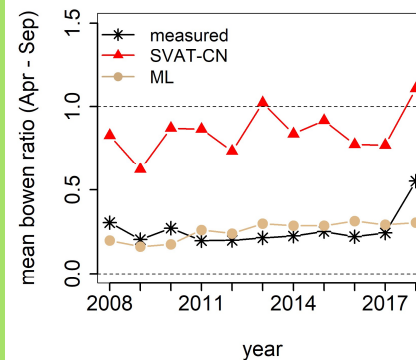
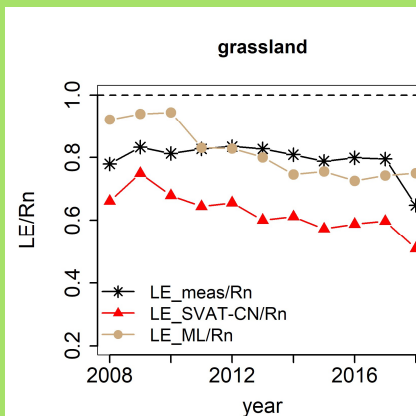
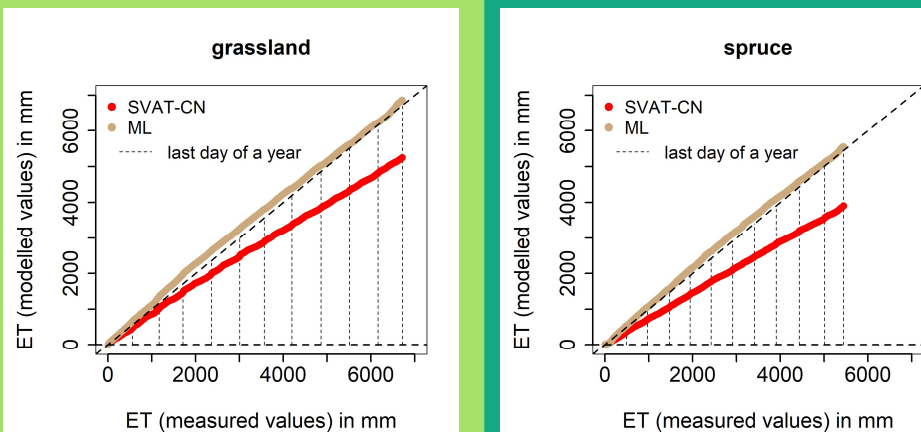
Sites



- co-located sites in south east Germany
- +/- same climate
- differ in field capacity
34 Vol% 23 Vol%

Results

Double mass curves over 11 years



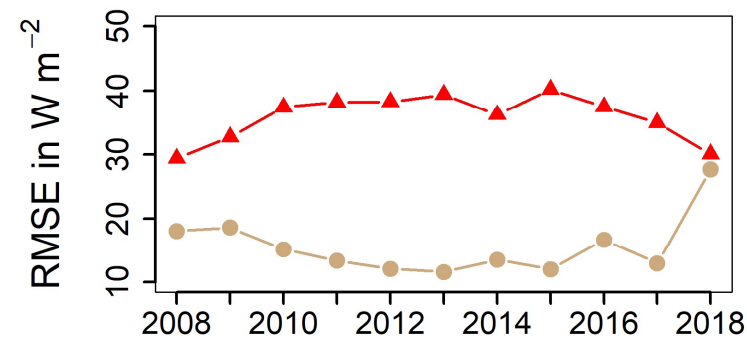
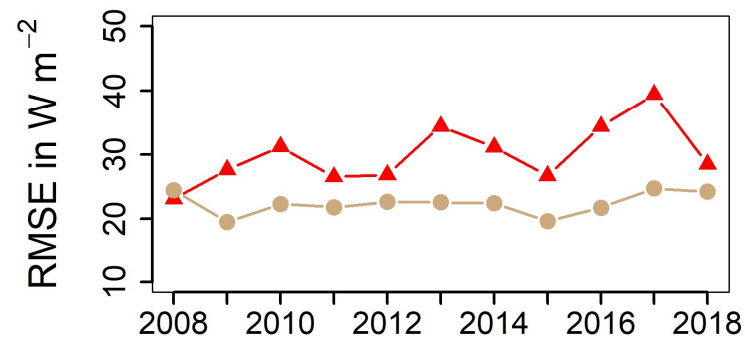
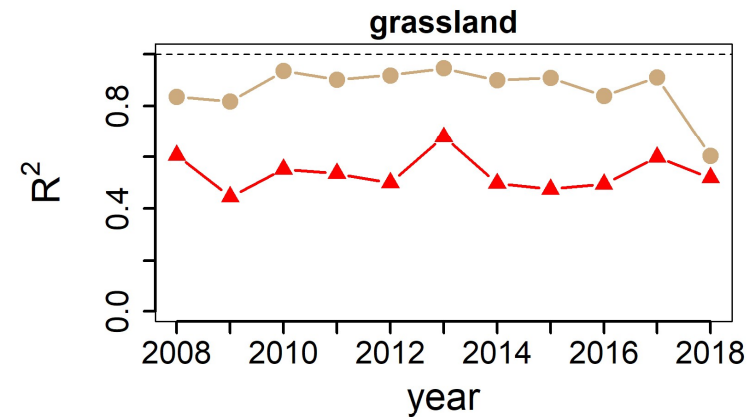
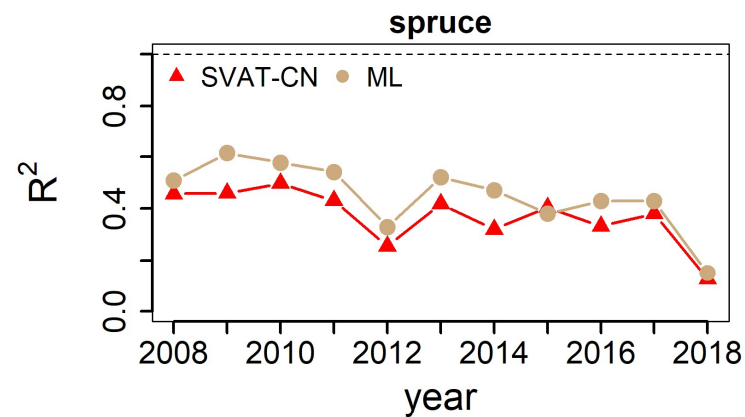
Evaporative fraction

Bowen ratio

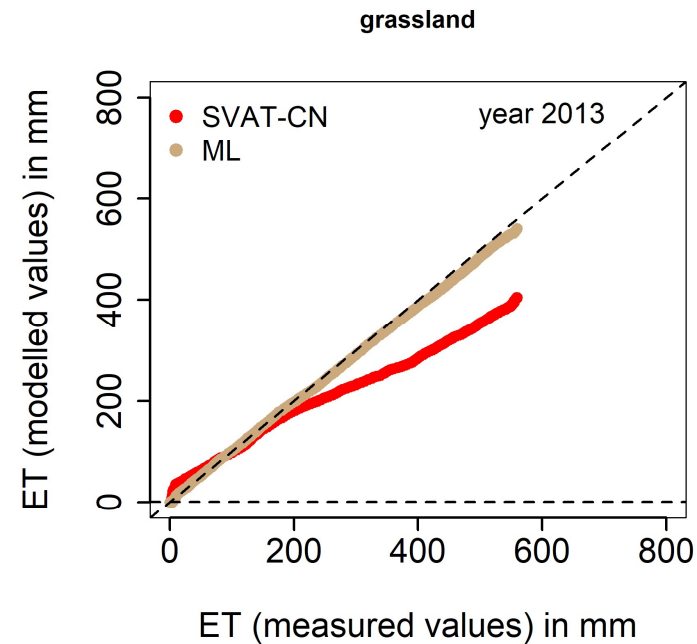
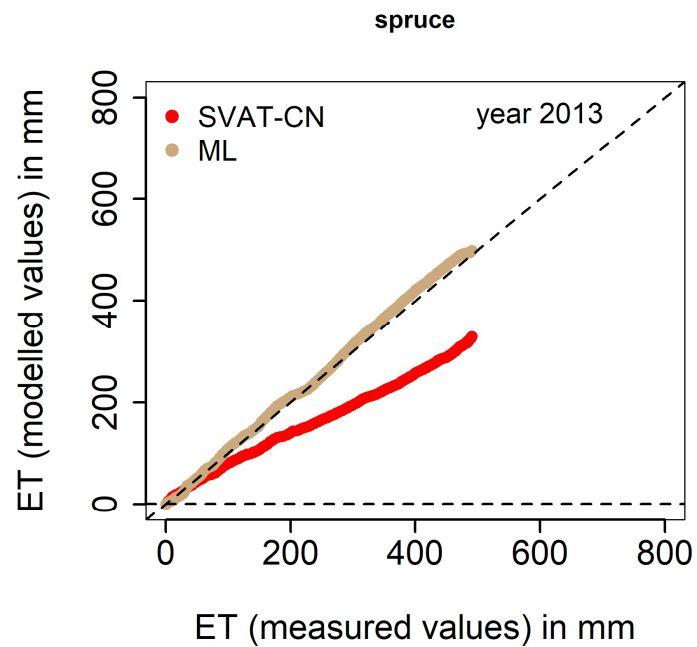
Conclusion

- ML promising approach (but no representation of processes)
- SVAT-CN improvement likely by better parameters

Further material



R^2 , RMSE (based on daily data of Apr – Sep of each year)



Typical differences in double mass curves between SVAT-CN and ML (year 2013)



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ET of a mosaic landscape – measurements and modelling

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References

Falge, E., Reth, S., Brüggemann, N., Butterbach-Bahl, K., Goldberg, V., Oltchev, A., Schaaf, S., Spindler, G., Stiller, B., Queck, R., Köstner, B., and Bernhofer, C.: Comparison of surface energy exchange models with eddy flux data in forest and grassland ecosystems of Germany, Ecological Modelling, 188, 174–216, <https://doi.org/10.1016/j.ecolmodel.2005.01.057>, 2005.

Körner, P., Kronenberg, R., Genzel, S., and Bernhofer, C.: Introducing Gradient Boosting as a universal gap filling tool for meteorological time series, 369–376, <https://doi.org/10.1127/metz/2018/0908>, 2018.

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