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Reply on RC3

Leah A. Jackson-Blake et al.

Author comment on "Seasonal forecasting of lake water quality and algal bloom risk using a continuous Gaussian Bayesian network" by Leah A. Jackson-Blake et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-621-AC3, 2022

Seasonal forecasts for weather variables are available with lead times of up to 6 (or even 9) months, and include wind speed forecasts. Of course you're right that the skill of these forecasts is variable and often low, particularly at longer lead times and outside the tropics (El Nino is the dominant source of seasonal climate predictability, so seasonal climate forecasting skill is often low outside the tropics). Seasonal climate forecasts are also probabilistic and can only give a broad indication of the likely direction of change, e.g. in terms of terciles ("there is a 60% chance that next summer will be windier than normal"). At our study site, we did find that the ECMWF's SEAS5 seasonal climate forecasting system could produce skillful forecasts for a number of weather varriables, including wind speed, in spring (March-May), but skill was lower for the other seasons (Jackson-Blake et al., 2022; https://hess.copernicus.org/preprints/hess-2021-443/). So while you're right that seasonal climate forecasting isn't quite there yet in terms of being able to provide very skilled wind (or temperature or precipitation) forecasts outside the tropics, there are "windows of opportunity" which could be valuable for forecasting water quality, and it is an area of active research which is improving constantly. Of course it ended up being a mute case in this particular study, as neither wind nor precipitation added to the predictive skill of the GBN. If they had, then we would have carried out an extra validation step to look at whether these weather nodes were still worth keeping in the model when seasonal climate forecasts were used to predict seasonal wind and precipitation, instead of observed weather data. This is something which we didn't mention in the current version of the manuscript, but which would probably be worth expanding on a little in any revised version in case others have the same question.