Forecast summary for 2023-05-15 – Pueblo Reservoir Inflow

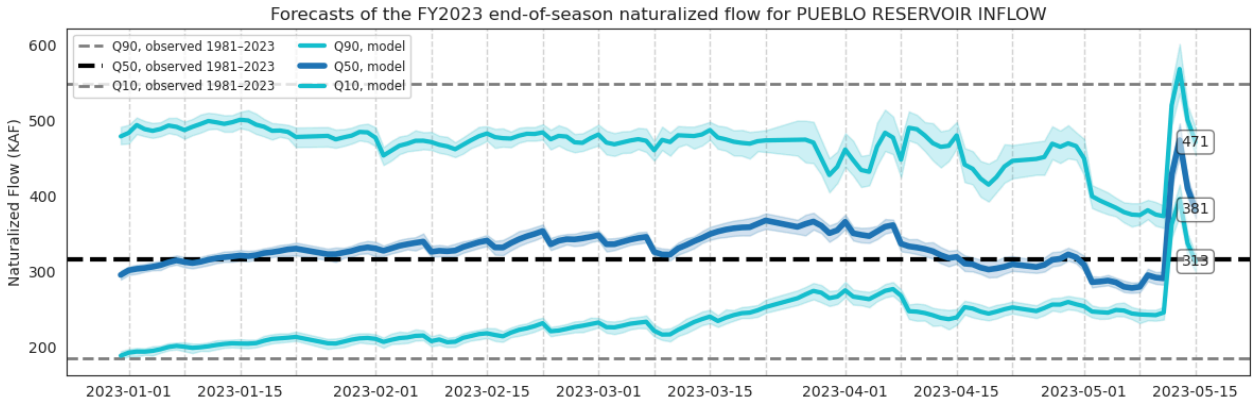

Figure 1. Model forecasts and observed quantiles. Shading indicates the ensemble range.

The forecast year 2023 at Pueblo Reservoir Inflow is predicted to be wetter than normal (Fig 1), although the variance of the most recent forecasts is considerable. All forecasted model quantiles jump upwards by almost 200 KAF at 2023-05-11 and after two days, begin normalizing towards the values before 2023-05-11. Before jumping up the model forecasted near normal or slightly below normal natural flow accumulations.

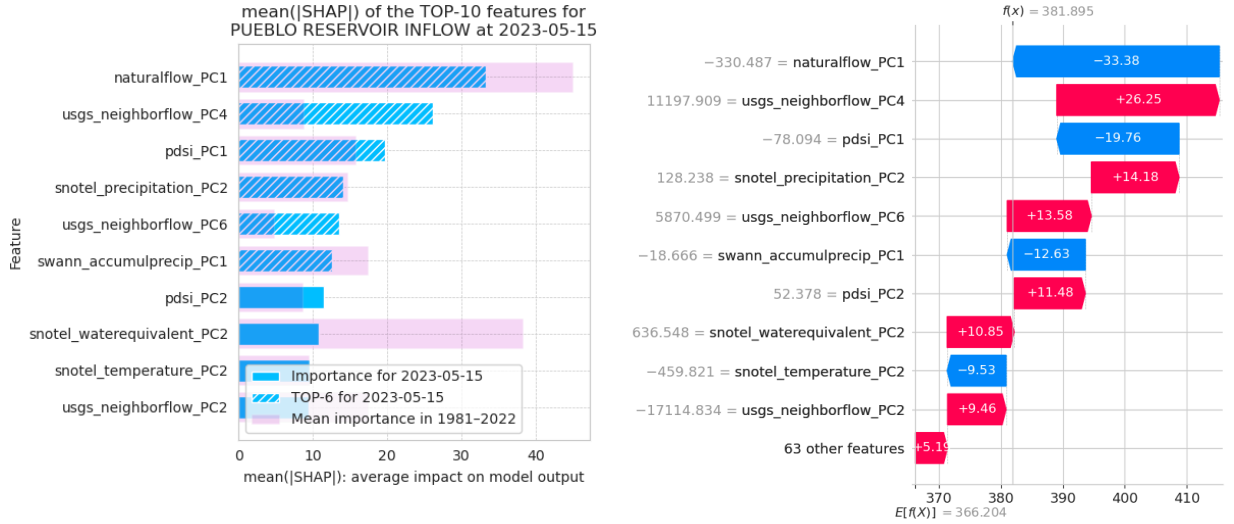

Figure 2. Left: the mean(|SHAP|) feature analysis. Right: the contribution of features to the issue date forecast relative to the long term mean.

The forecasted jump is caused by a sudden increase of the measured flow in several USGS streamflow sites (18 of 76 in total, not shown) inside and near the catchment. Sudden increases of flow rates are typical to this catchment. Three principal component features describing this phenomenon can be seen in the SHAP analysis (Fig 2), all contributing positively to the forecast. At the same time the SNOTEL precipitation stations in the mountainous western part of the domain report above normal precipitation rates (Figs 2, 3 and 4), and a more detailed station analysis (not shown) reveals a torrential precipitation event around 2023-05-10, which explains this surge in the observed flow rates and eventually in the forecasted flows as well.

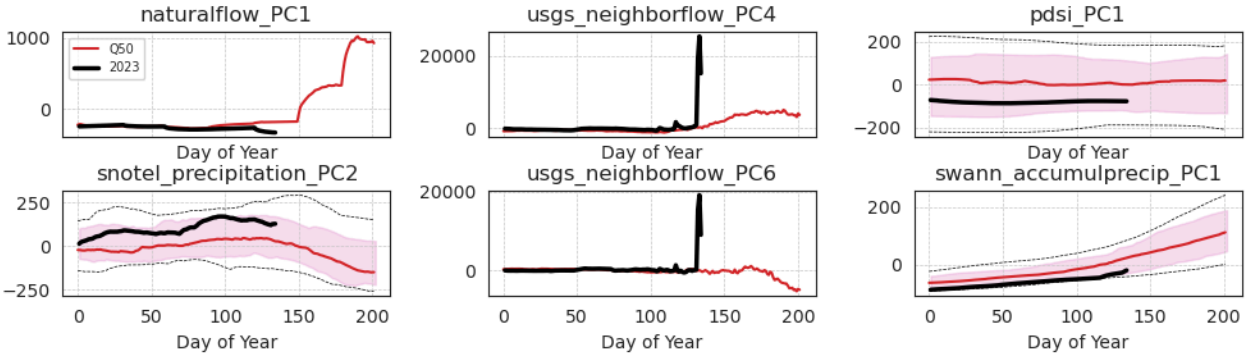

Figure 3. The forecast year time series and the climatological distributions of the TOP-6 most important features contributing to the forecasts of the current issue date.

Because the features derived from the normalized flow are effectively in the monthly time resolution and therefore updated in the beginning of the month (Fig 4), those can not see the recent increase in the flow. This causes a strong negative contribution from the most important feature describing the mean natural flow rate, which still indicates the previous dry conditions.

The eastern and central part of the catchment is suffering from drought. How much the recent rainfall event can normalize the drought conditions and the natural flow rates remains to be seen. That and the future precipitation will mostly determine the streamflows of the remaining season.

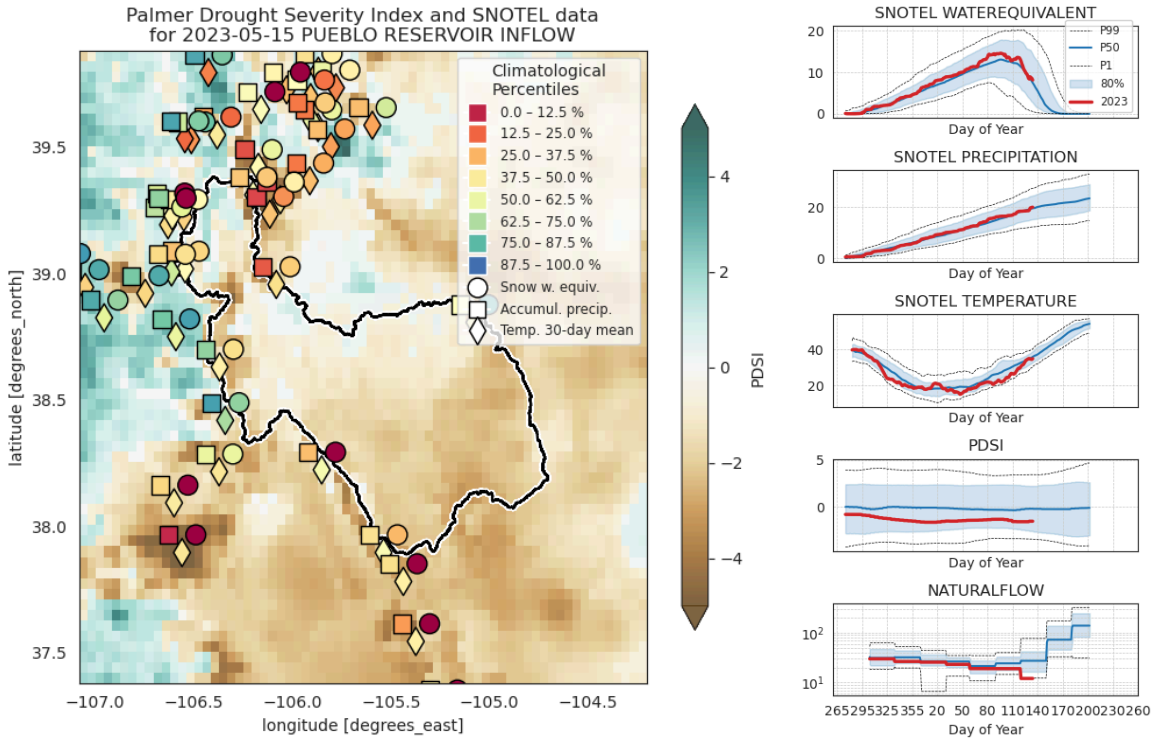

Figure 4. Left: the PDSI and SNOTEL data for the current issue date. Right: climatological quantiles and data for the current forecast year for the key data sets.