Question 1: Combining observational data with nowcasting fields for current status

1. ad-hoc combination of different sources to create a hybrid product summarising the status (e..g similar to US drought monitoring). Could be done for different sectors

2. Use observations to filter out ensemble outputs / keep the members the closest to observation. Would need for HydroSOS to create a protocol methodology to filter. This would reduce the uncertainty due to the possible large range of forcing data. Variables that would be needed: soil moisture, streamflow, snow pack

3. Data assimilation. This could be of satellite products and gauged observations. Will depends on modelled / observed state variables . This is a challenging technical issue under research -> might be difficult to implement operationally within the pilot phase. Would be best to focus on the DA of hydrological state variables (wet/dry soil; streamflow; status of storage)

4. Verification of model outputs and forecasts

Question 2: Type of modelling methods and desired level of complexity

Long discussion about the benefits of conceptual vs physically-based vs statistical modelling approaches. Complexity not guarantee of performance, but distributed modelling might help in ungauged areas (more difficult to transpose parameters in lumped catchment conceptual models). Choice should depend on the products to be delivered, the scale (spatial and temporal) wanted and observational data availability. If possible, the models should include was to simulate water reservoir management.

The HEPEX test-bed (led by Andy Wood) could be a good way to investigate and compare different modelling approaches. The initiative has already started by HydroSOS partners are very welcome to join. See hepex website for more information

Question 3: Criteria and approaches for modelling choice

1. Depends on the information available, and spatial and temporal scale wanted for the modelling

2. Must produce outputs useful locally -> requirement products must drive model specification, not the other way round

3. Multi-model approach e.g. combining physically-based models and statistical approaches.

Question 4: existing modelling tools that could be integrated in hydroSOS

1. Establish principles for calibration and verification of models -> minimum performance

2. Treatment of uncertainty in modelling concept -> must be integrated. If possible modelling compatible with running experiments to attribute uncertainty sources

3. Open source models would be favoured but requires good manual, record of use in varied hydro-climatic zones and good performance. This is especially important to support countries with no modelling capacity.