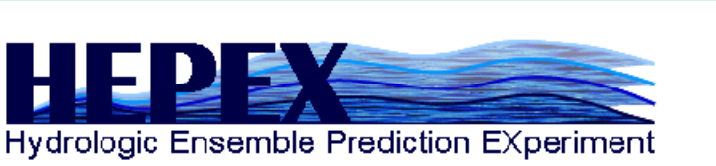
Introduction to the Workshop, Organization of the Sessions, Overview of the Experimental Design Document

Jutta Thielen

John Schaake

Albrecht Weerts

Schalk Jan van Andel



Our Hosts

- UNESCO – IHE
- Deltares

Workshop Organizers

- Schalk Jan van Andel
- Albrecht Weerts
- Jutta Thielen
- John Schaake

Science Steering Committee

Albrecht Weerts
Andras Szöllösi-Nagy
Andy Wood
D. J. Seo
Florian Pappenburger
Hamid Moradkhani
James Brown
Jasper Vrugt
Jay Day
John Schaake
Julie Demargne
Konrad Bogner
Luke Wang
Maria-Helena Ramos
Nathalie Voisin
Paolo Reggiani
Qingyun Duan
Robert Hartman
Roland Price
Schalk Jan van Andel
Stefano Tibaldi
Thibault Mathevet
Tom Hopson
Tom Pagano
Vincent Fortin

Background

- HEPEX
  - Goal
  - Workshops and Special Sessions
  - Testbed Projects
  - Non-bureaucratic, Volunteer, Grass-roots
- June, 2008 1st Post-Processing Workshop @ Deltares
  - Post-processing overview
  - Science plan for a post-processing testbed project
  - Need for intercomparison studies

Experimental Design Rationale

Hydrologic Ensemble Postprocessing Strategy/Hypothesis

One approach to developing a hydrologic ensemble postprocessor is to use the total probability law

$$f\left(qobs \middle| fcst\right) = \int_0^{+\infty} f\left(qobs \middle| qsim\right) f\left(qsim \middle| fcst\right) dqsim$$

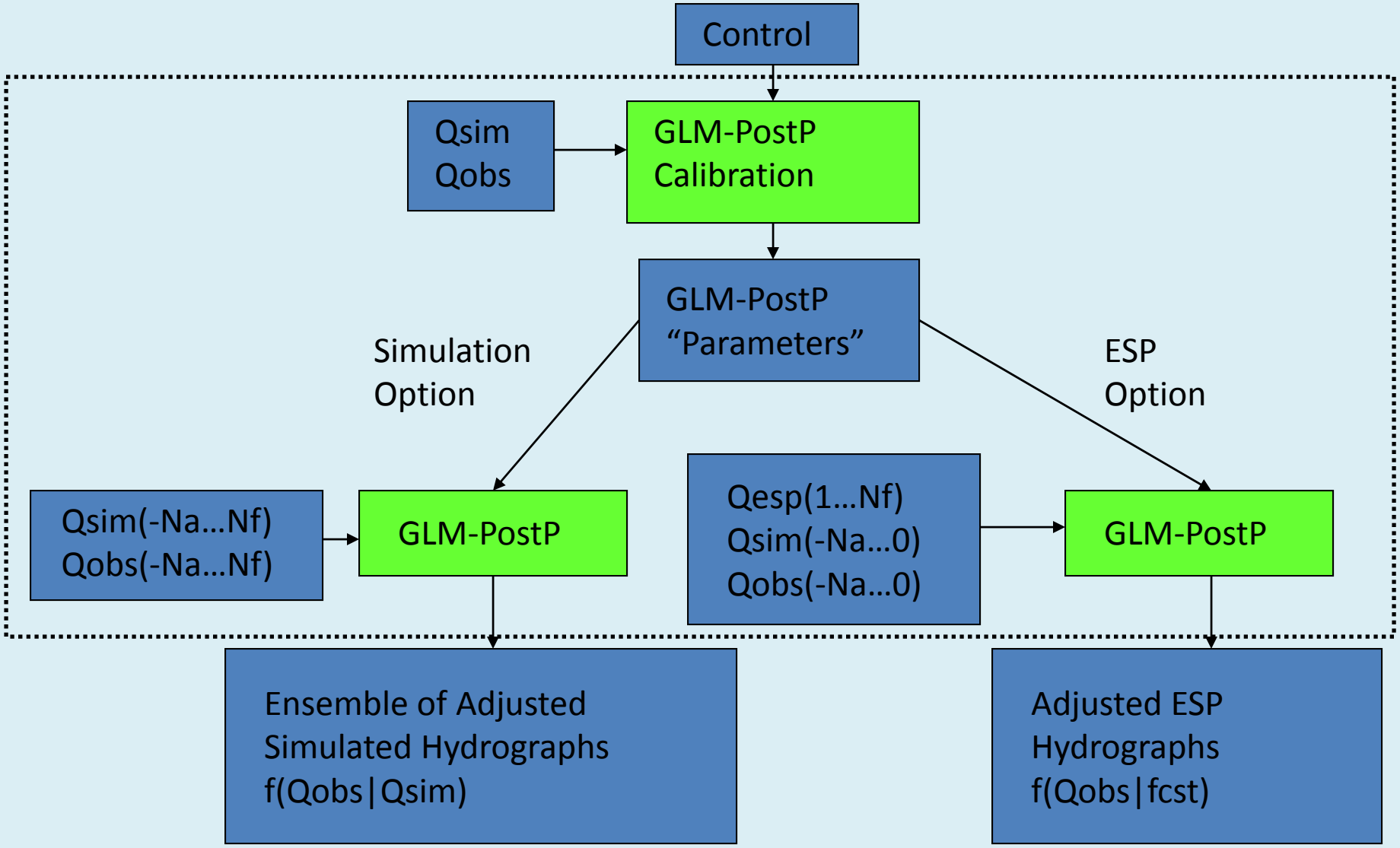
Adjusted ESP Forecast

Historical Simulation

Raw ESP Forecast

to represent the conditional distribution of observed flows, given the ESP forecast distribution of simulated flows. If the climatology of all ESP hydrograph members, qsim, is the same as the climatology of the simulated hydrographs produced by the calibrated hydrologic model, then the historical calibration simulations can be used to estimate f(qobs|qsim).

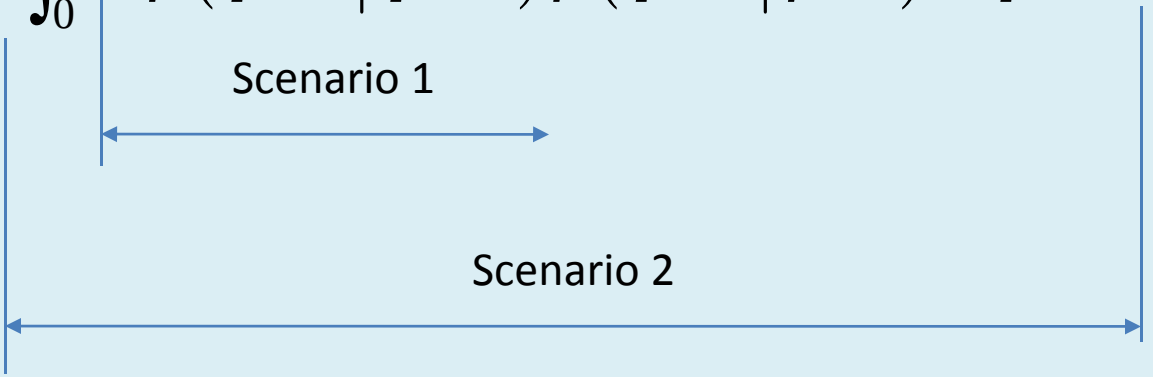
GLM Hydrologic PostProcessor



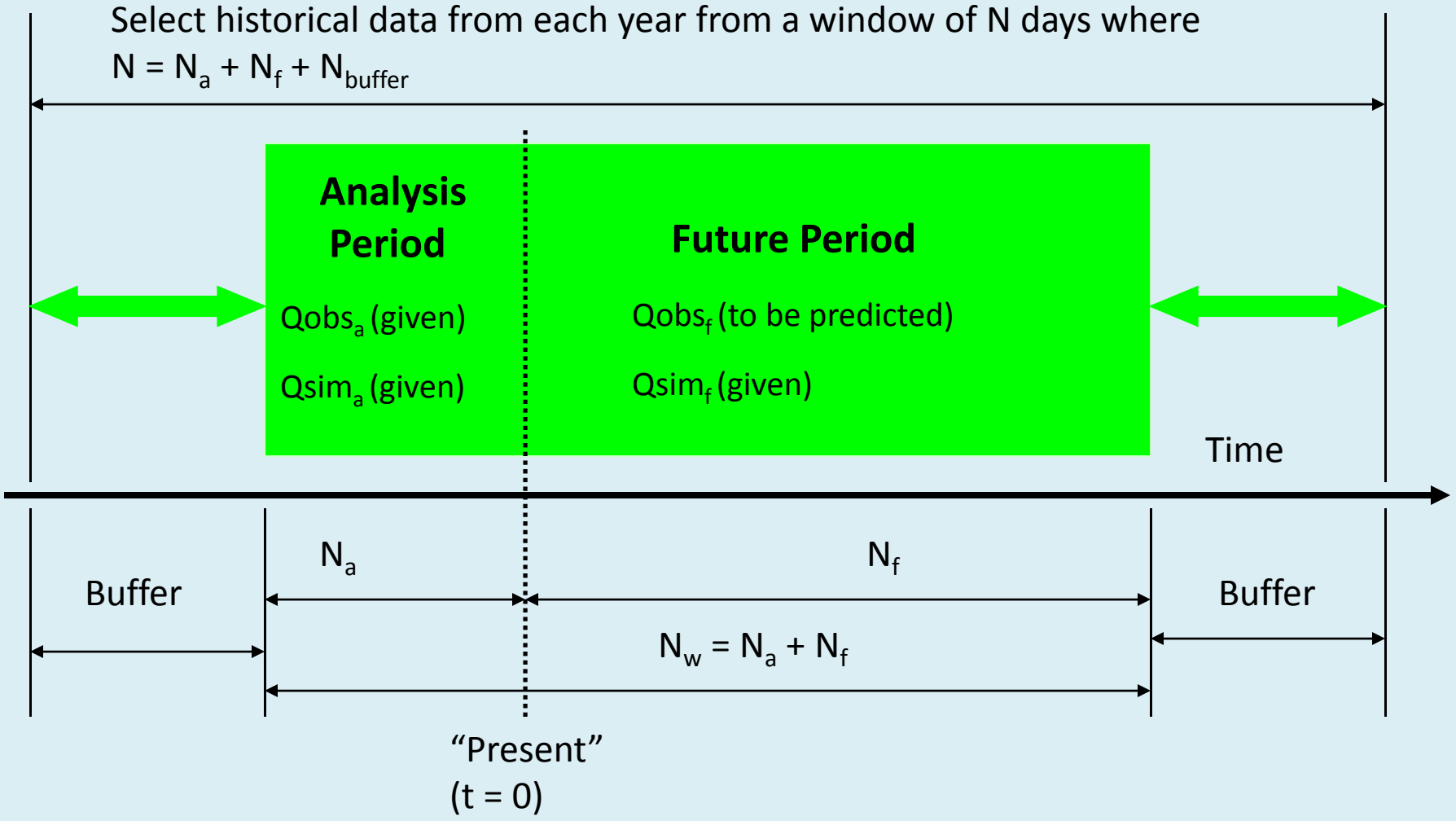
Experimental Design Document

- Scenario 1 – Hydrologic Model Simulation
- Scenario 2 – Hydrologic Ensemble Prediction

$$f\left(qobs\middle|\, fcst\right) = \int_0^{+\infty} f\left(qobs\middle|qsim\right) f\left(qsim\middle|\, fcst\right) dqsim$$



Historical Data Processing



Note: N_{buffer} sets of N_w days of data are taken from each of N_{YRS} years of data. This gives $N_{OBS} = N_{YRS} * N_{buffer}$ observations for each day

Challenges

- Identify user needs
  - Have users help to create post-processing approaches to meet their needs
  - Merge theory and practice
- Identify possible approaches
  - None of us have all the answers
  - What can we learn from each other?
- Collaboratively test and refine our hypotheses
  - Together we can do anything
  - But what should we do?
- Publish our results
  - Special issue of Hydrological Processes and/or JHM