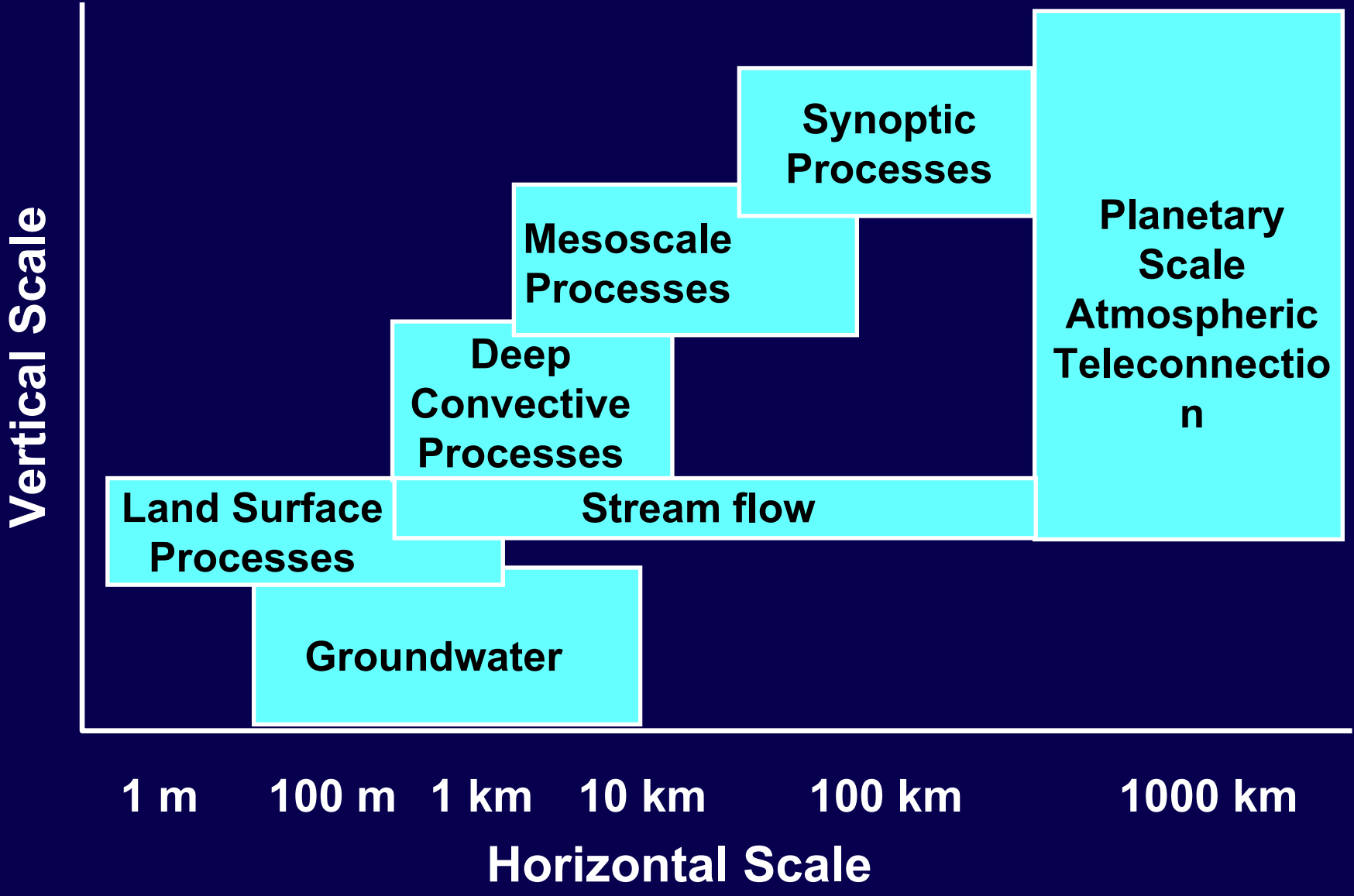
DRI Theme 2

Improve the Understanding of Processes and Feedbacks Associated with the Recent Canadian Prairie Drought

1. What processes and feedbacks were responsible for the onset of the recent drought?
2. What contributed to the drought's evolution, persistence, and spatial structure?
3. What controlled the termination of this drought?

Spatial Scale of Processes and Feedbacks



Theme 2 Milestones for Years 2-3

1. Continuation of enhanced observation of:
   - Atmospheric processes
   - Surface hydrological processes
   - Groundwater processes
2. Data acquisition from collaborating agencies
3. Data rescue from previous observations
4. Selection of numerical models
5. Initial model evaluations with simple scenarios
6. Hypothesis testing and new hypothesis generation

"Action Items" from Breakout Session in 2007

- Monitoring of long wave pattern and relevant atmospheric systems, frequency of surface or elevated convection.
- Inter-seasonal feedbacks from the land-surface.
  - snowpack
  - soil moisture
  - wetlands and ponds
- Relationship between evaporation and ground-water during drought

Warm-season Water Transport & Cycling

Kit Szeto

Virga

Ron Stewart

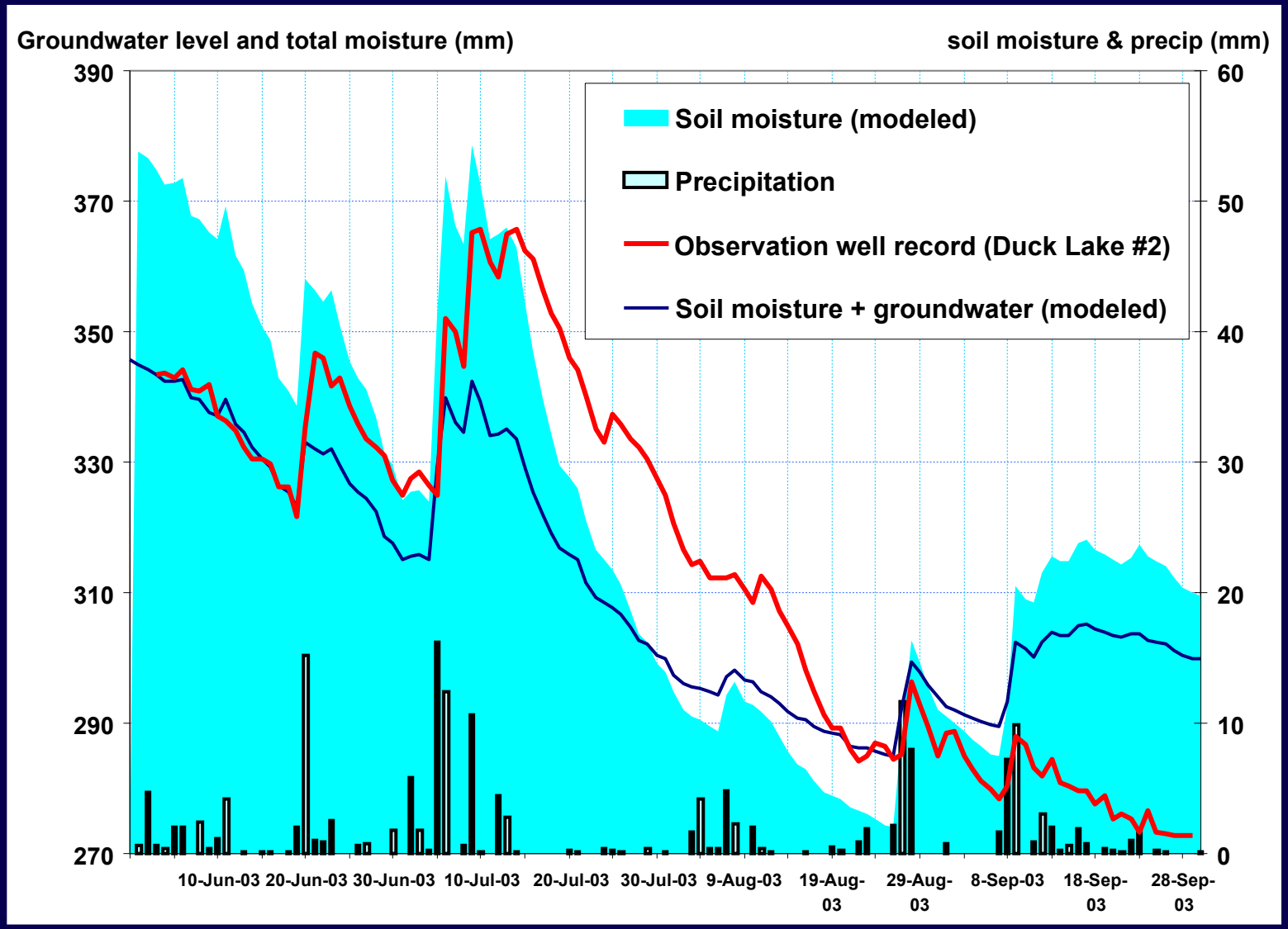
Precipitation sublimates or evaporates before reaching the ground.

Evaporation and Soil-Atmosphere Interaction

John Hanesiak and Masaki Hayashi

Groundwater and Soil Moisture Storage

Garth van der Kamp



Examples of Theme 2 Activities

- Theoretical study of atmospheric “blocking” using the National Centers for Environmental Prediction data.
- Detailed examination of a major storm during the drought in 2002.
- Moisture recycling in boundary layer at St. Denis.
- Focussed study on evaporation by several DRI investigators.
- Land surface - groundwater coupling (field study and model development).
- Snow drift and snowmelt runoff.

Theme 2 Challenges

1. Data validation (e.g. CanGrid) and integration.
2. Challenges within each process (e.g. soil-plant feedback relation for evaporation).
3. Linking individual process studies.

Expectation for Breakout Session

- Critical research gaps and challenges discussed in an integrated framework (all scales and processes).
- Priority research areas for 2008/09 identified.