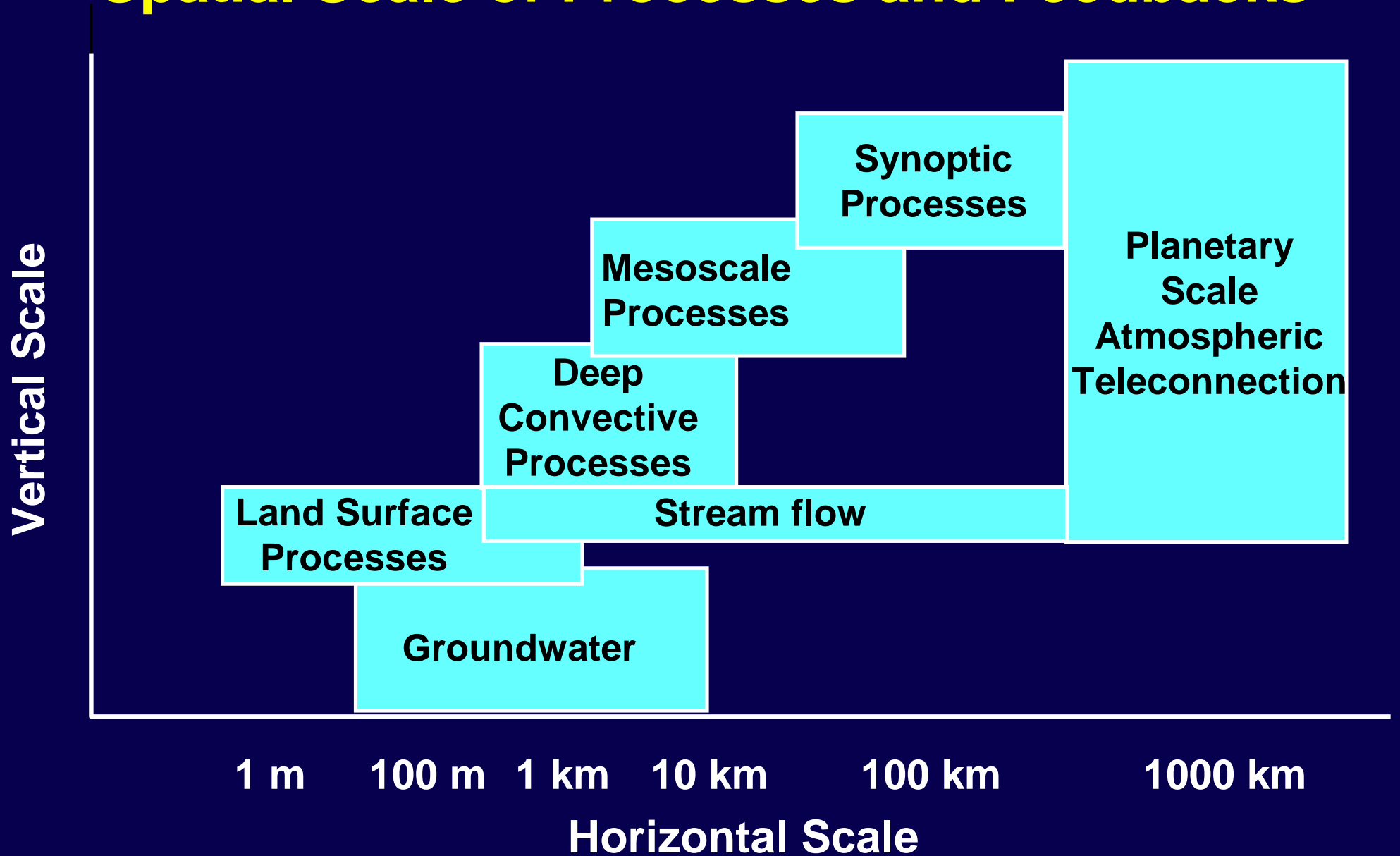


DRI Theme 2

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 Year 1

- 1. Initiation/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**

Issues from Breakout Session in 2006

1. How do we define droughts?
2. **Evapotranspiration** is the critical atmosphere-surface feedback. How can we improve our understanding of ET?
3. Small-scale, or even point study will be effective for examining **runoff generation**.
4. On-going process studies started after 1999. How can we examine the processes that initiated the drought in 1999?
5. In order to examine the processes, we need to look beyond the most recent drought - important to carry out Theme 4.
6. What is the role of **groundwater**?
7. What is the relative importance of **synoptic scale forcing vs atmospheric instability**?
8. How does **convection** develop over wet-dry boundaries of the land surface (10-100 km scale)?

Priority Action Items from Breakout Session

1. Water balance of small watersheds to evaluate the change in moisture storage, with special emphasis on ET.
① **Cross-cut working group on ET.**
2. Evolution of droughts at synoptic scale, with emphasis on synoptic forcing and atmospheric instability.
① **Cross-cut working group on atmospheric large-scale processes.**
3. Convection associated with wet/dry boundaries of the land surface.
① **Enhanced study by John Hanesiak, Rick Raddatz, and Geoff Strong.**

Progresses in Hydrological Processes

- 1. Enhanced study at St. Denis and West Nose Creek**
 - Snow accumulation and melt, ET, depression storage (Pomeroy and Pietroniro)**
 - ET and groundwater recharge (Hayashi)**
- 2. Detailed analysis of archived data.**
 - Deep groundwater well as a large-scale lysimeter (van der Kamp and Pietroniro)**
 - Spring wheat yield do not correlate well with standard meteorological indicator (Bullock)**
- 3. Models tested.**
 - Cold Regions Hydrological Model (CHRM)**
 - Modified Versatile Soil Moisture Budget (VSMB)**
 - WATFLOOD**

Progresses in Atmospheric Processes

Theme 2 Challenges and Plans

- 1. Surface-atmosphere feedback, such as ET**
- 2. Atmospheric large-scale processes controlling drought.**
- 3. Testing model algorithms against field data.**

Expectation for Breakout Session

- 1. Critical research gaps and challenges discussed in an integrated framework (all scales and processes).**
- 2. Priority research areas for 2007/08 identified.**