

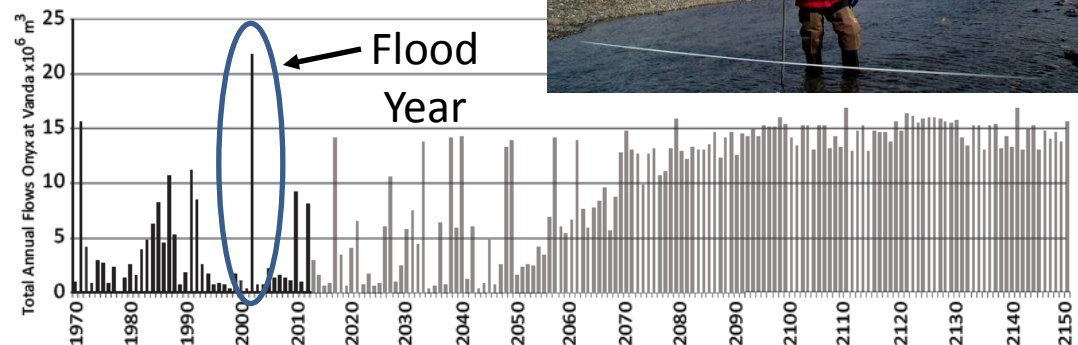
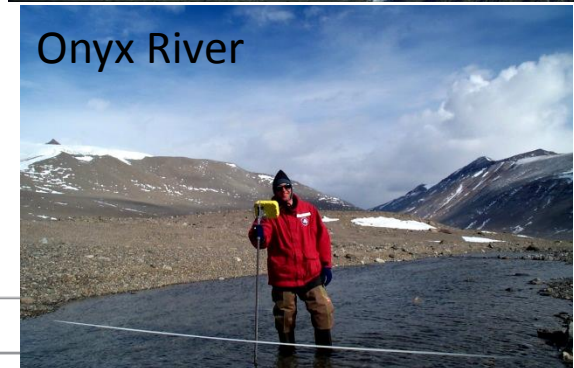
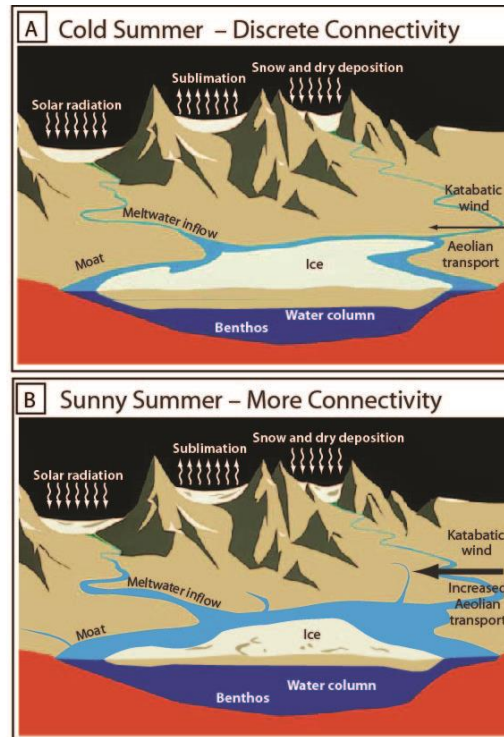


Advancing NPP Research McMurdo Dry Valleys LTER

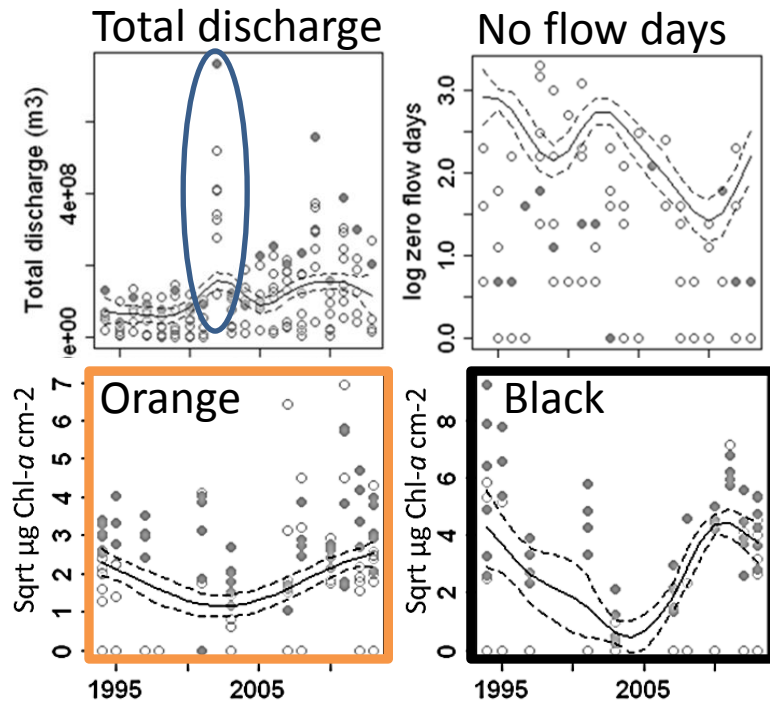


MCM NPP Question:

How does NPP in lakes and streams respond to hydrologic disturbances associated with a dynamic climate?

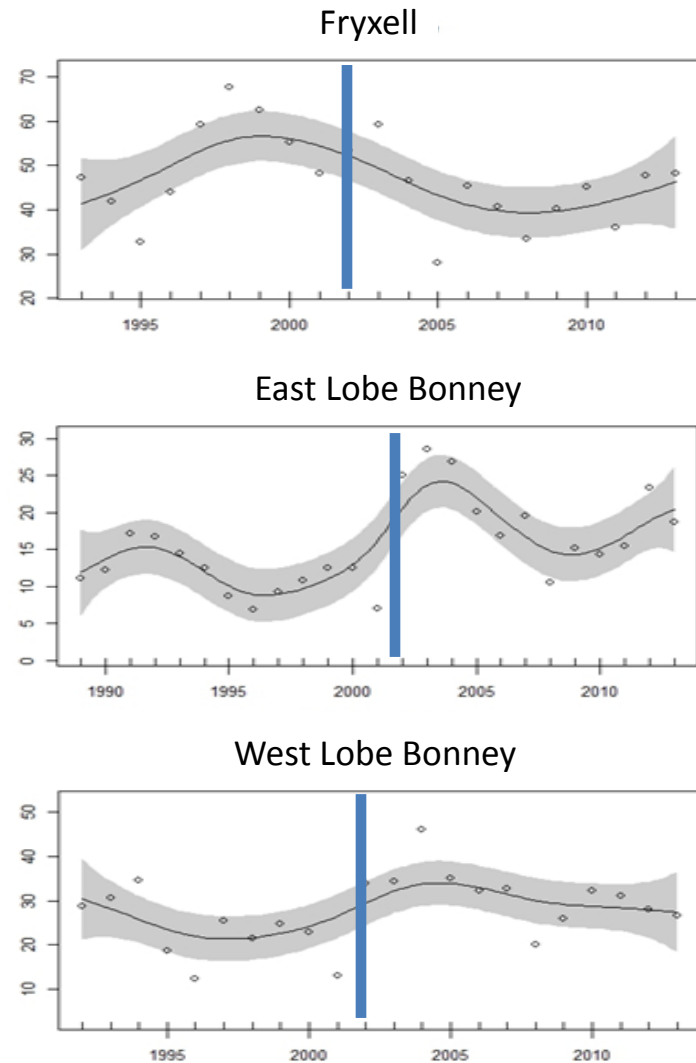


Hydrologic extremes regulate algal biomass of lakes and streams



Lake phytoplankton biomass stopped increasing after the “flood”

Integrated Chlorophyll-a (mg m⁻²)



Discoveries made possible by LTER:

- Prolonged cooling due to ozone hole:
 - Caused gradual increase in lake NPP related to increased ice-cover and nutrient dynamics
 - desiccates microbial mats reducing NPP
- Enhanced connectivity during high flows :
 - promotes gradual decrease in lake NPP
 - scours microbial mats, transporting CPOM to lakes



Suggestions for synthesis:

- Ecological interactions among global scale stressors
- Hydrologic extremes and aquatic ecosystems: the return of the flood-pulse

Predicted responses to flow

		High Flows		Low Flows	
High Coverage	Losses	Green		Green	
		Orange X	• Scour of mats on stable stone pavement	Orange	• Desiccation of habitat outside thalweg
		Black		X	
	Gains	Green	X	X	• Slow growth/little scour
Low Coverage		Orange	• High growth rates	Orange	
		Black			
	Losses	Green	X	Green	• Desiccation outside thalweg, hyporheic zone
		Orange	• Scour of talus, mobilization of deltaic substrata	Orange	X
		Black			
	Gains	Green		Green	• Slow growth rates
		Orange X	• Gain habitat at stream margins, hyporheic zone	Orange	
		Black			

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Kohler et al., *Ecosystems*, in revision