

# Climate-mediated coupling of hydrology and biogeochemistry on arctic hillslopes

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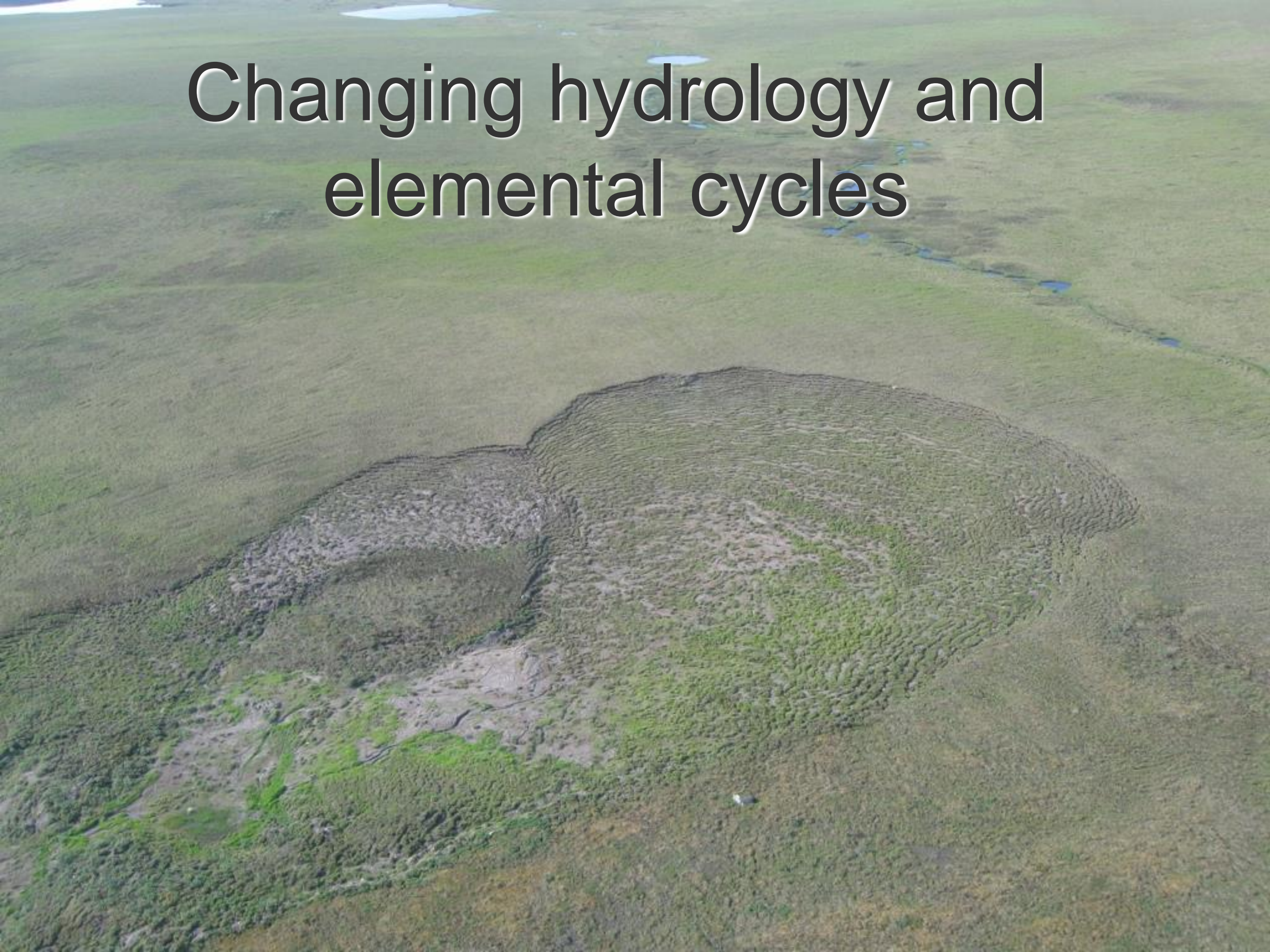
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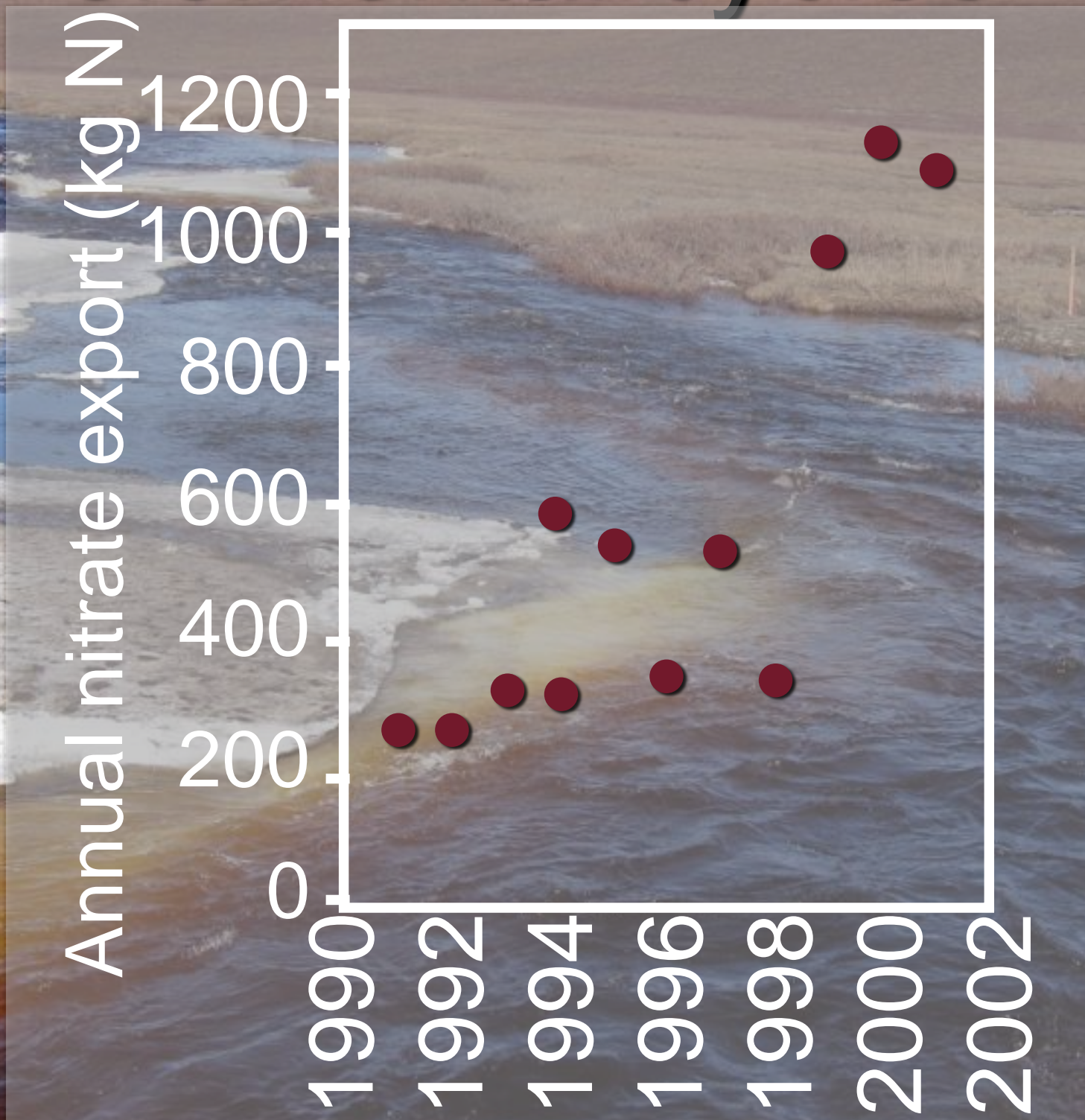


# Changing hydrology and elemental cycles





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McClelland et al. 2007



# Water tracks

An aerial photograph showing a winding river or stream flowing through a vast, green, hilly landscape. The river is dark blue and meanders from the upper right towards the bottom right of the frame. The surrounding terrain is covered in dense green vegetation, with some lighter green patches indicating different types of plants or perhaps bare soil. The overall scene is a natural, undisturbed landscape.

30% of the Upper Kuparuk basin (McNamara et al. 1997)



# Climate-mediated coupling of hydrology and biogeochemistry on arctic hillslopes

- How do storage and transport of water influence temporal patterns in fluxes of water and solutes from water tracks?
- How does delivery of water and solutes by hydrologic flowpaths influence uptake and transport of N and P within water tracks?



# Water tracks

- Continuously measure discharge (flumes fitted with pressure transducers)
- Monitor thaw and snow dynamics (thermocouples, manual surveys)
- Daily water chemistry (automated samplers)
- Storm chemistry (precipitation gauge triggered)
- Nutrient uptake experiments (surface and subsurface)





# Support to date

CPS: snowmachines, boardwalks

Fairbanks expeditor

Shop access, building expertise





# Support to date

Lab space:  
water,  
“wet” side/”dry” side

Office space (up to 5 people)

Key to have clear space assignments in  
advance, including sample storage



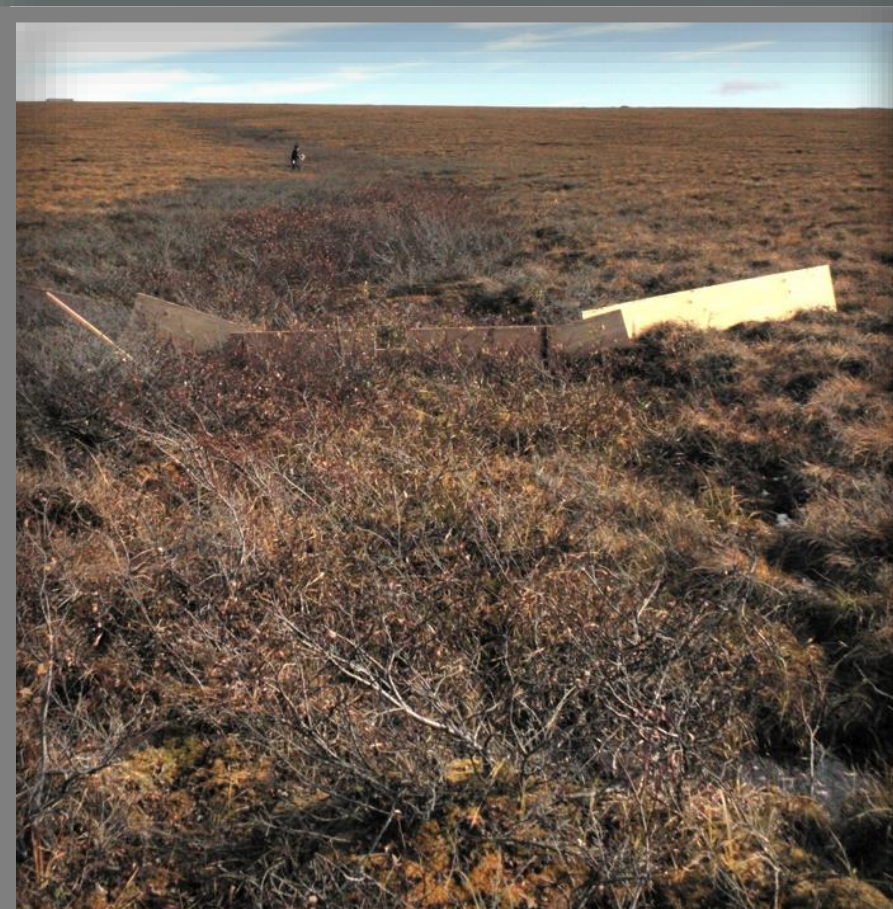
# Gear and personnel transport

- truck available for use in Fairbanks
- email notification when items arrive in Toolik or Fairbanks
- additional trucks FAI-Toolik and Toolik-SCC



# Science support

- refrigerator/freezer/space designated for natural abundance isotope work
- early (May) and late season (Sept) helo support
- support or streamlined permitting process





# Spatial data

- airborne LiDAR
- low elevation, high resolution imagery (J. Cherry)
- Clearinghouse for spatial data:
  - ▶ catalog available data
  - ▶ query needs
  - ▶ advocate for Toolik users

