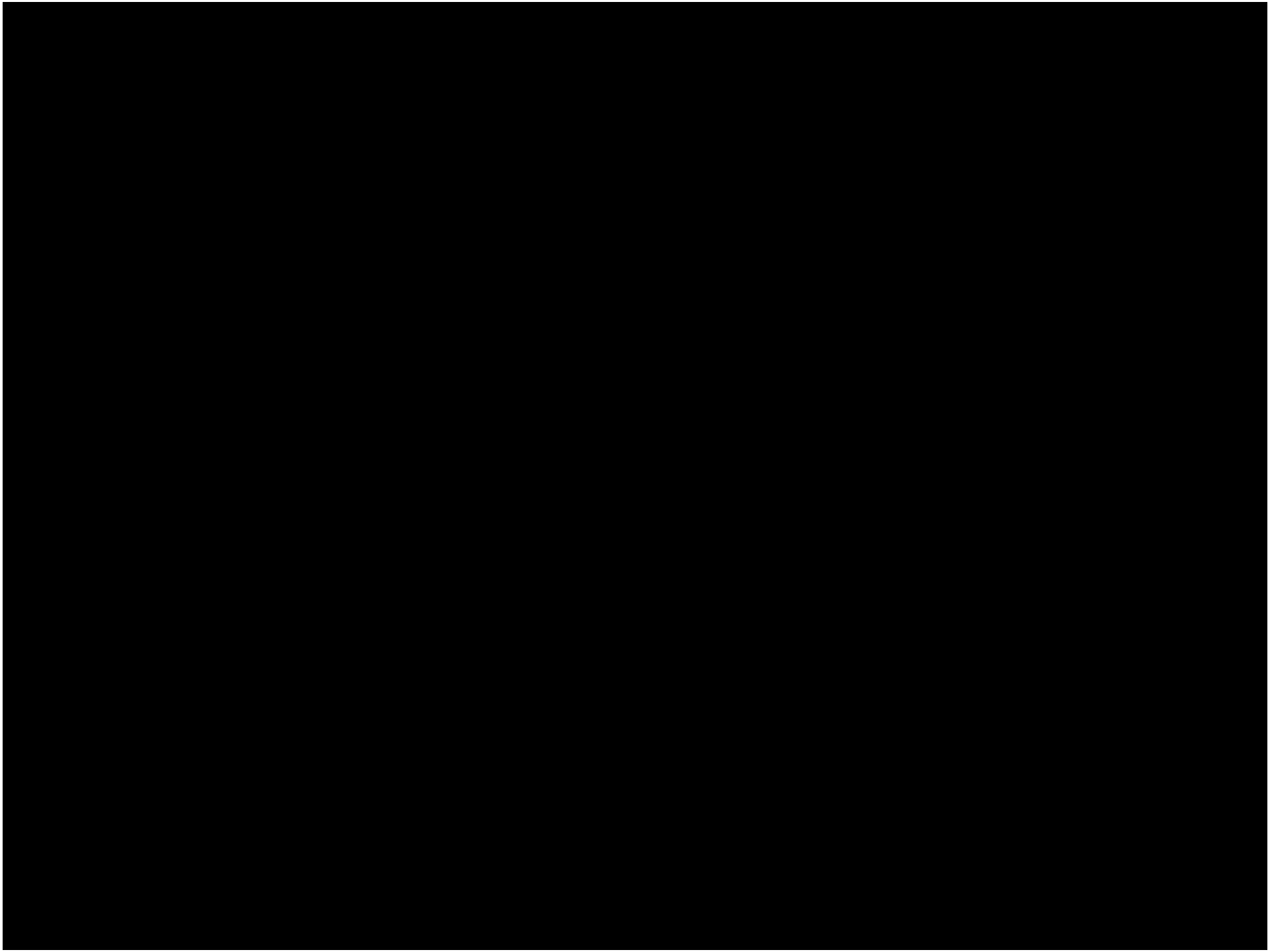
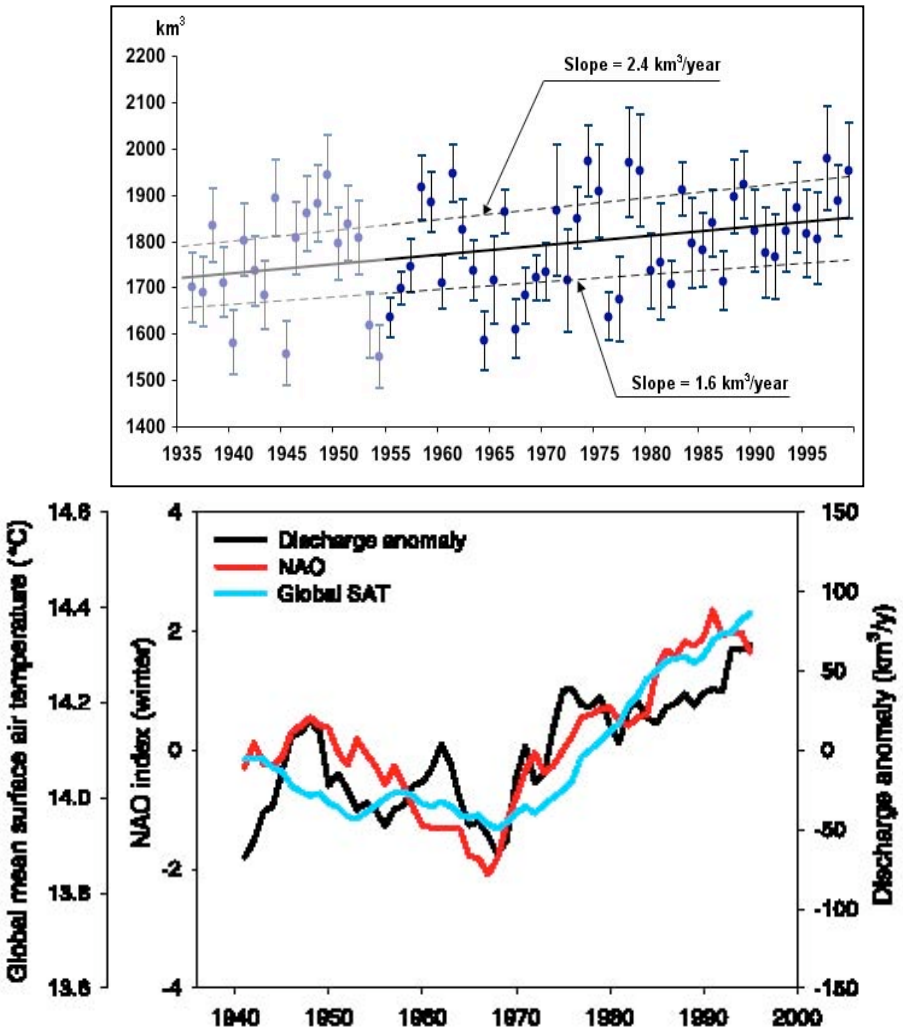


Combined Annual Discharge 6 Largest Eurasian Arctic Rivers --- 7% increase over period of record



Peterson et al. 2002, *Science w/ update*

KEY QUESTION

- What is (are) the source(s) of observed Eurasian discharge increases?

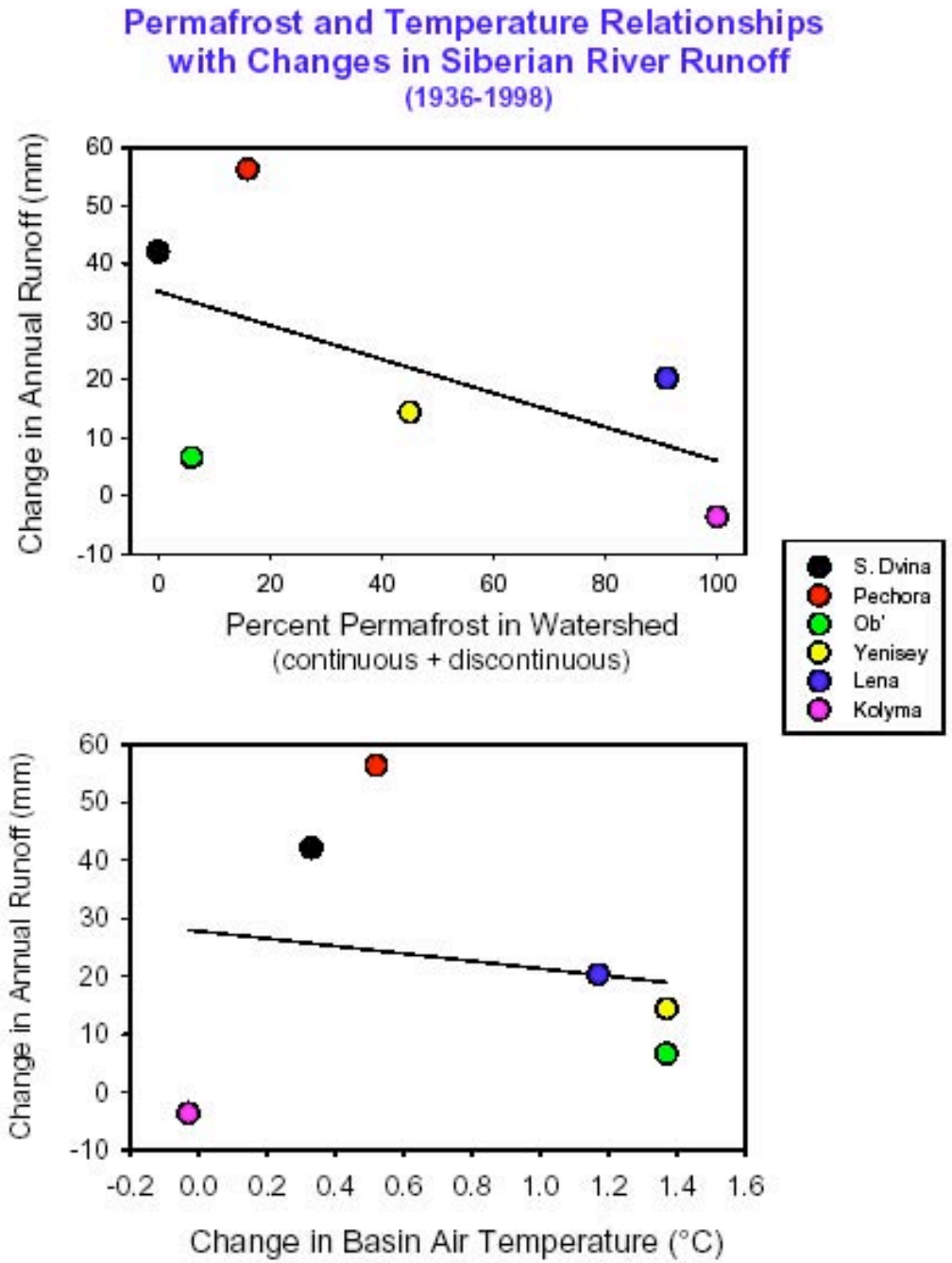
Changes arise from:

-Climate Forcings?
-Permafrost Active Layer?
-ET?
-Glacial Meltwater?
-Lakes and Wetlands?
-Thermokarsting?
-Land Cover?
-Nutrient-C-H2O Interactions?
-Water Engineering?

Do the changes arise from melting of permafrost & deepening of active layer?

Answer: Unlikely.

- 4m over all classes of PF
- >100m over discontinuous (i.e. most susceptible)



Courtesy: *J. McClelland, R.Holmes, B. Peterson*

How about loss of Eurasian Glaciers?

Basin	Ice Cover (km^2)	Discharge Anomaly ($km^3\ yr^{-1}$)	Additional Required Ice Melt ($m\ yr^{-1}$)	Present Required Melt ($m\ yr^{-1}$)	Total Melt 1936-2000 (m)
Dvina	0.0	0.21	---NA--	---NA--	---NA--
Kolyma	0.02	-0.03	---NA--	---NA--	---NA--
Lena	17	0.9	58	3700	120,000
Ob	870	0.25	0.31	20	650
Pechora	3.2	0.21	72	4600	149,000
Yenesei	28	0.56	22	1395	45,000

Answer: Again, unlikely. Ob is the one possibility….but such changes are remarkable and have in fact not been noticed

Courtesy: *M. Fahnestock, A.I. Shiklomanov*