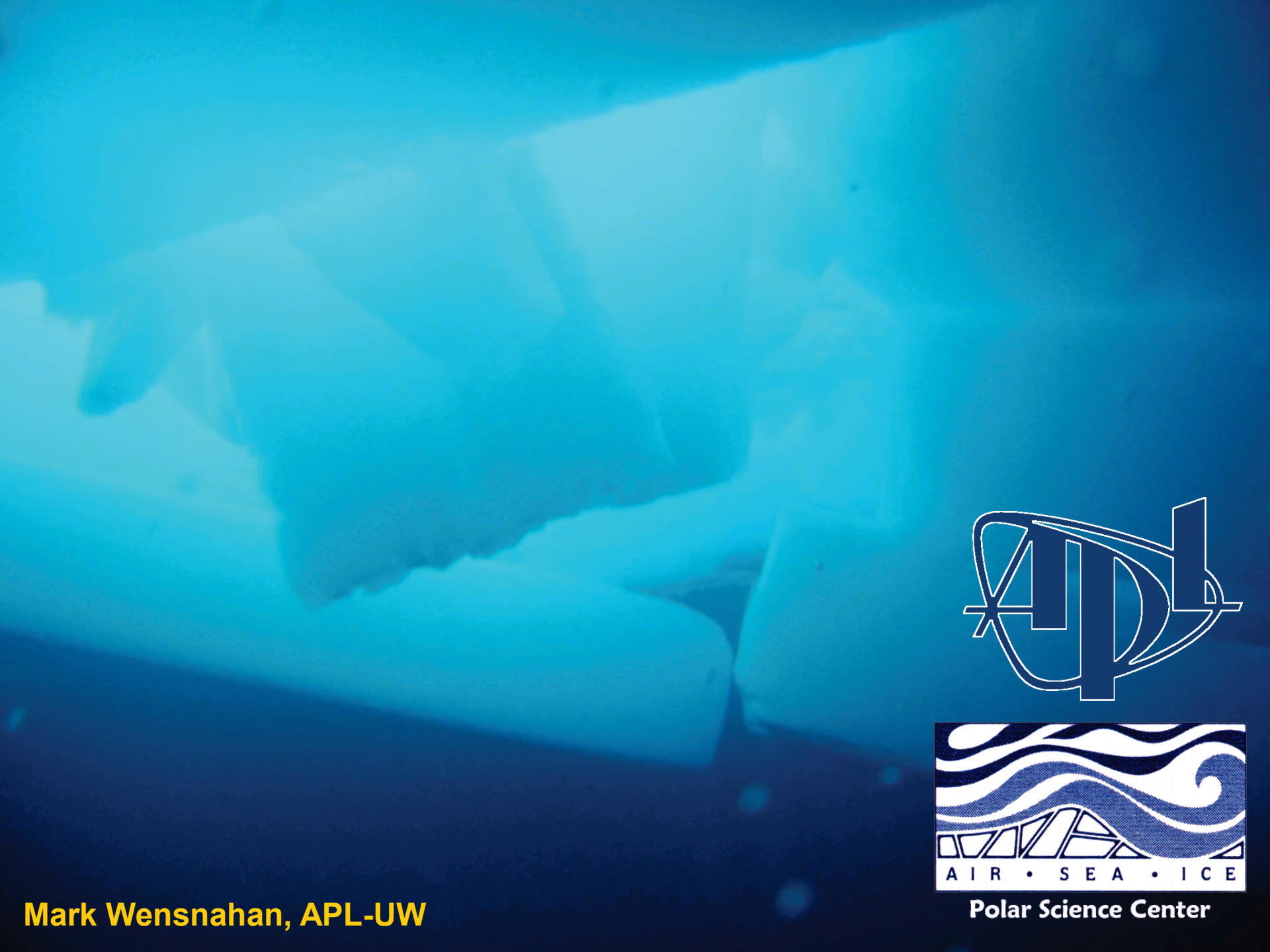


Mark Wensnahan, APL-UW

AIR • SEA • ICE
Polar Science Center

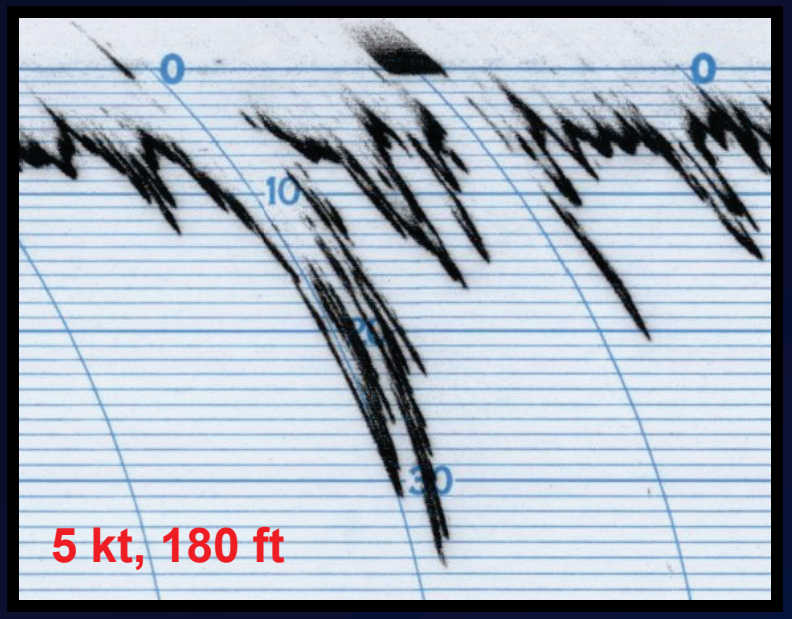
0. Dependence on Depth and Speed

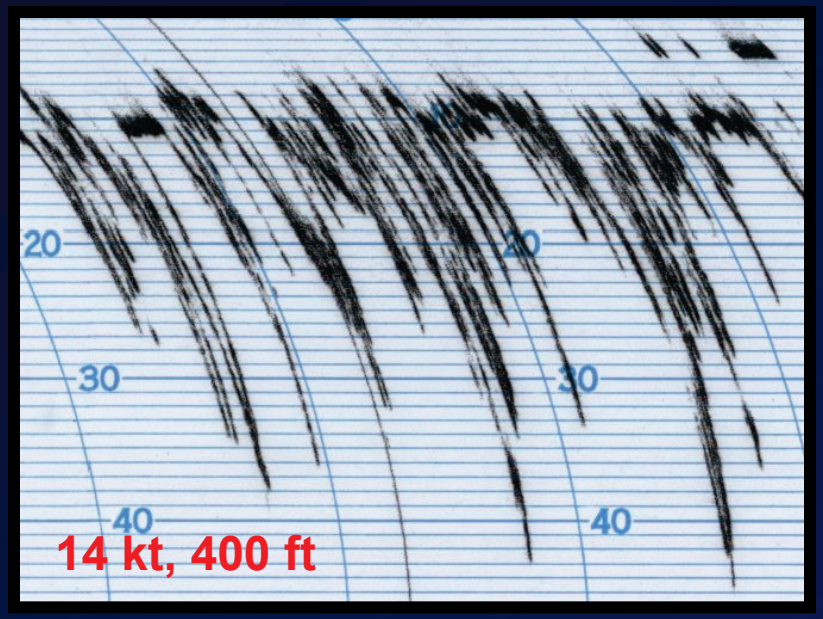
Data taken at range of depth and speed

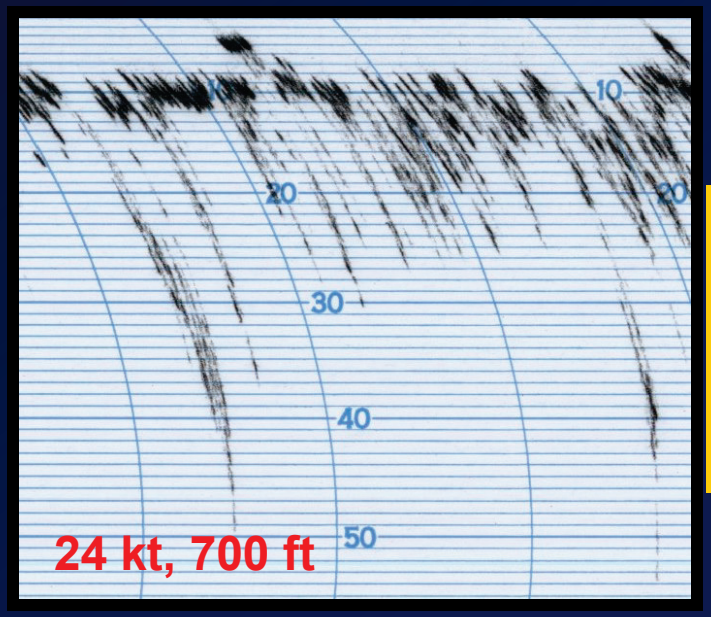
Switching to taking data at greater depth and speed

How does this impact the data?

1. Dependence on depth and speed







With increased depth, the return is fainter

With increased speed, analog chart overwritten

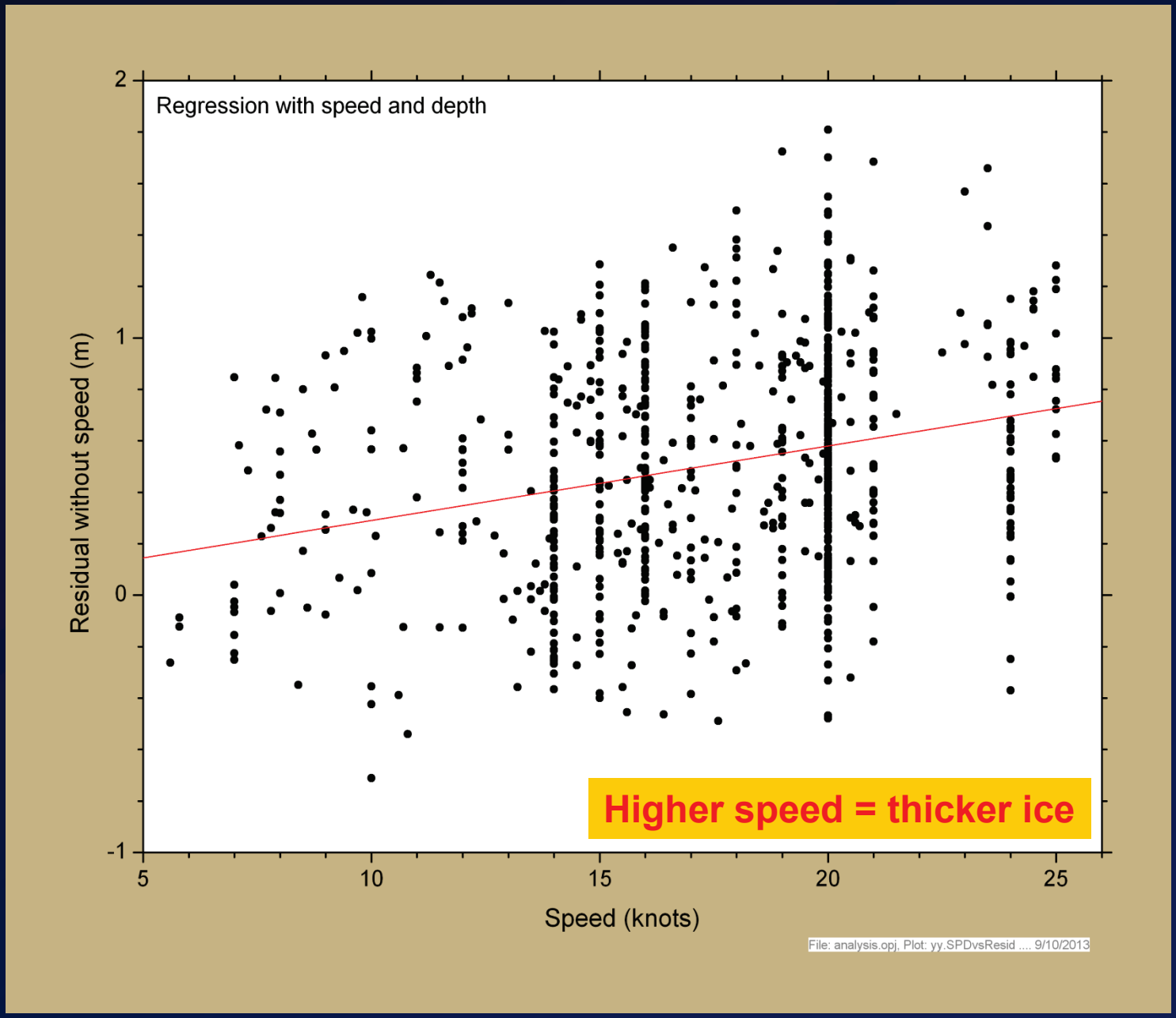
2. Dependence on speed and depth

Parameter	Coefficient	Uncertainty
Constant	3.130	0.128
Year	0.163	0.027
Year^2	-0.017	0.003
Year^3	3.906E-4	6.566E-5
Cos (day of year)	-0.328	0.043
Sin (day of year)	0.470	0.033
X	-0.001	8.51E-5
X^2	-2.024E-6	1.435E-7
X^3	-6.155E-10	6.33E-11
Y	-0.001	1.088E-4
Speed	0.029	0.005
Depth	-7.245E-4	7.567E-4

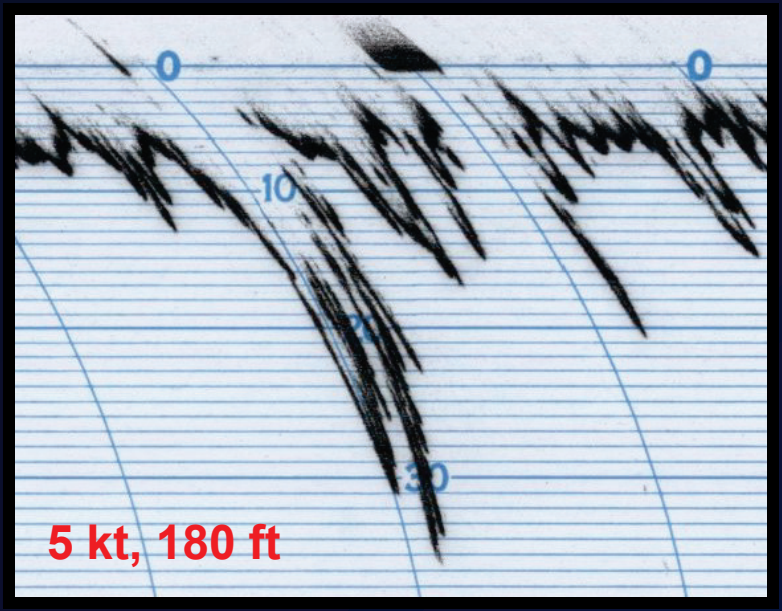
Analog data from NSIDC

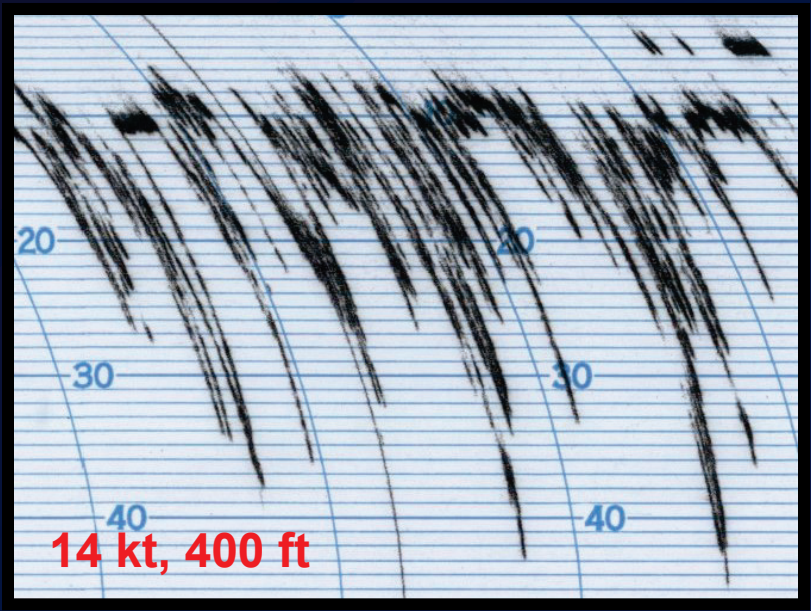
Draft not dependent on depth
Some dependence on speed

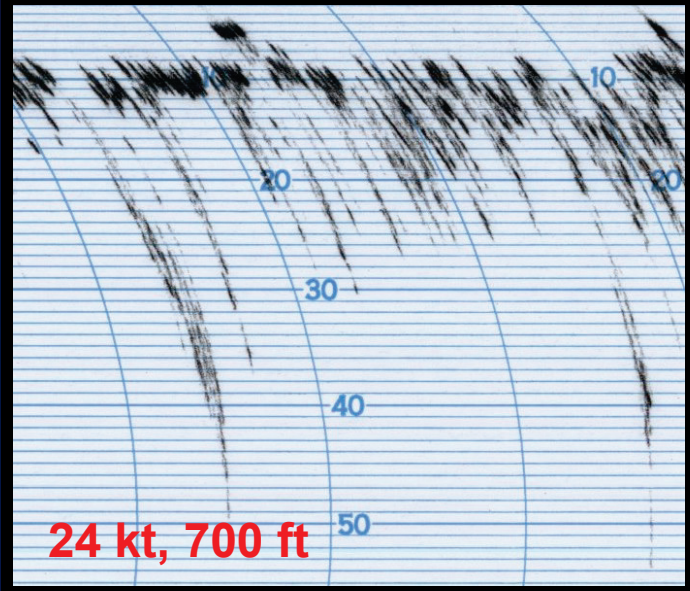
3. Dependence on speed



4. Speed Dependence







Dependence on depth due to overwriting

5. Dependence summary

Ice draft of analog charts

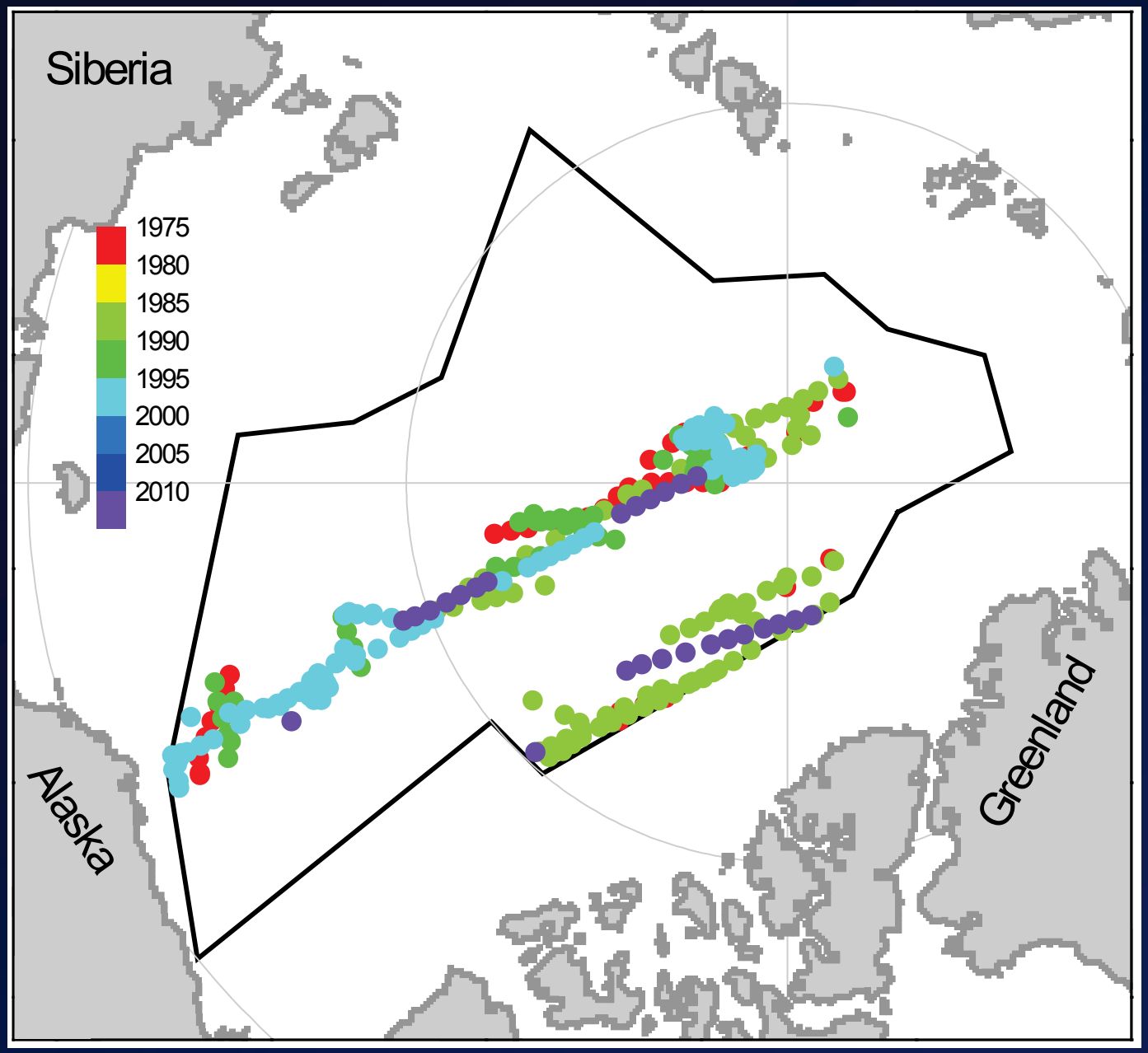
Draft depends on speed, not depth

Speed dependence due to overwriting of chart

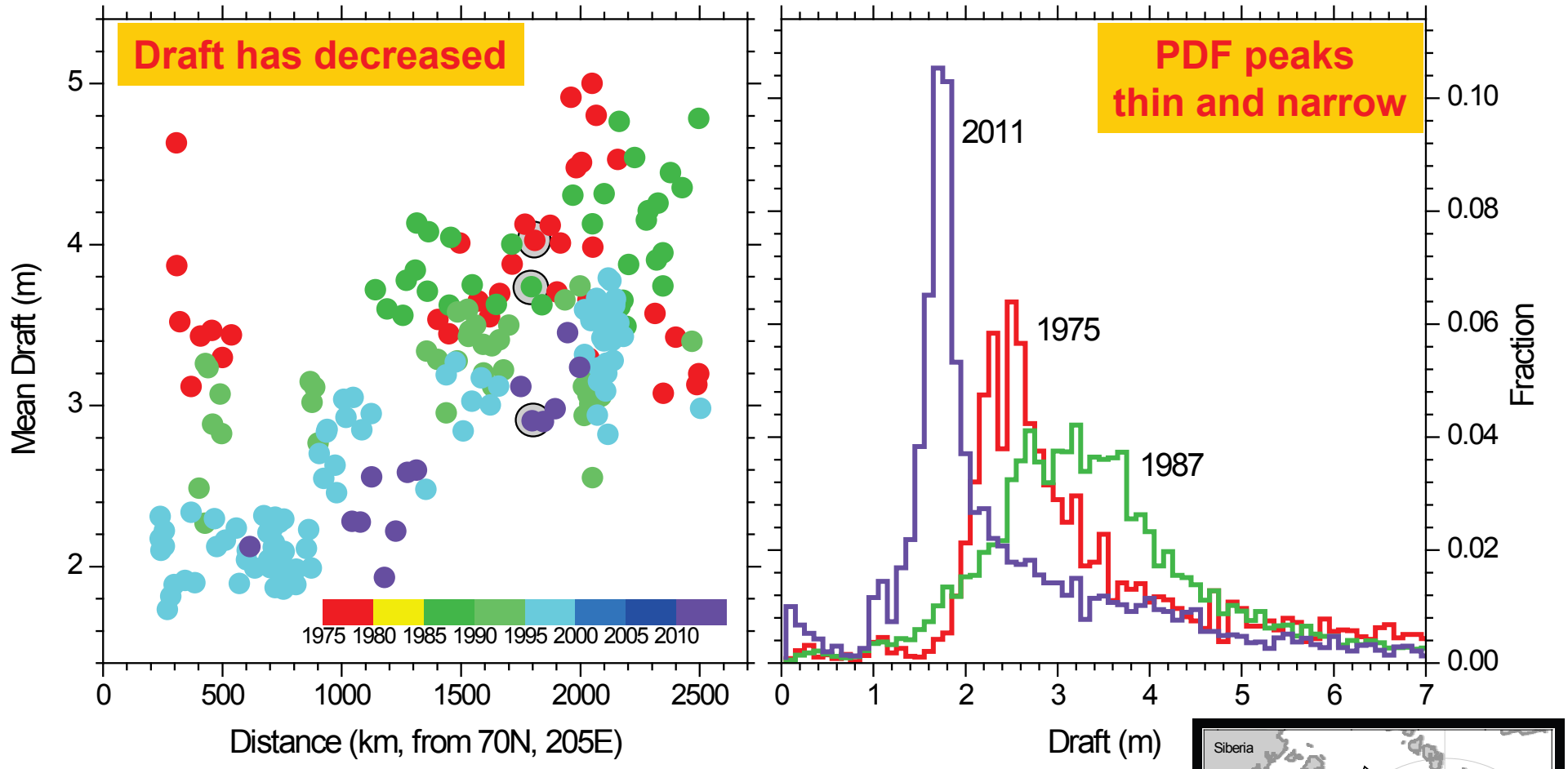
lack of depth dependence due to user defined threshold?

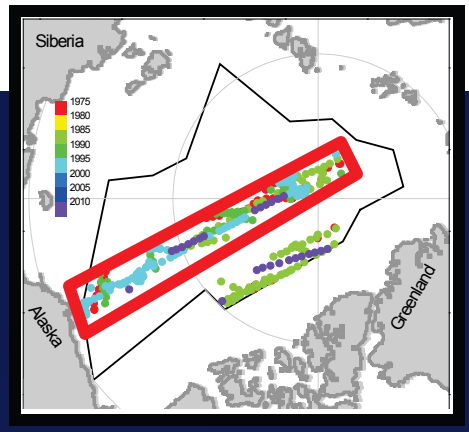
Digital data with full return (and user-defined threshold) should mitigate problem.

6. 2011 draft data

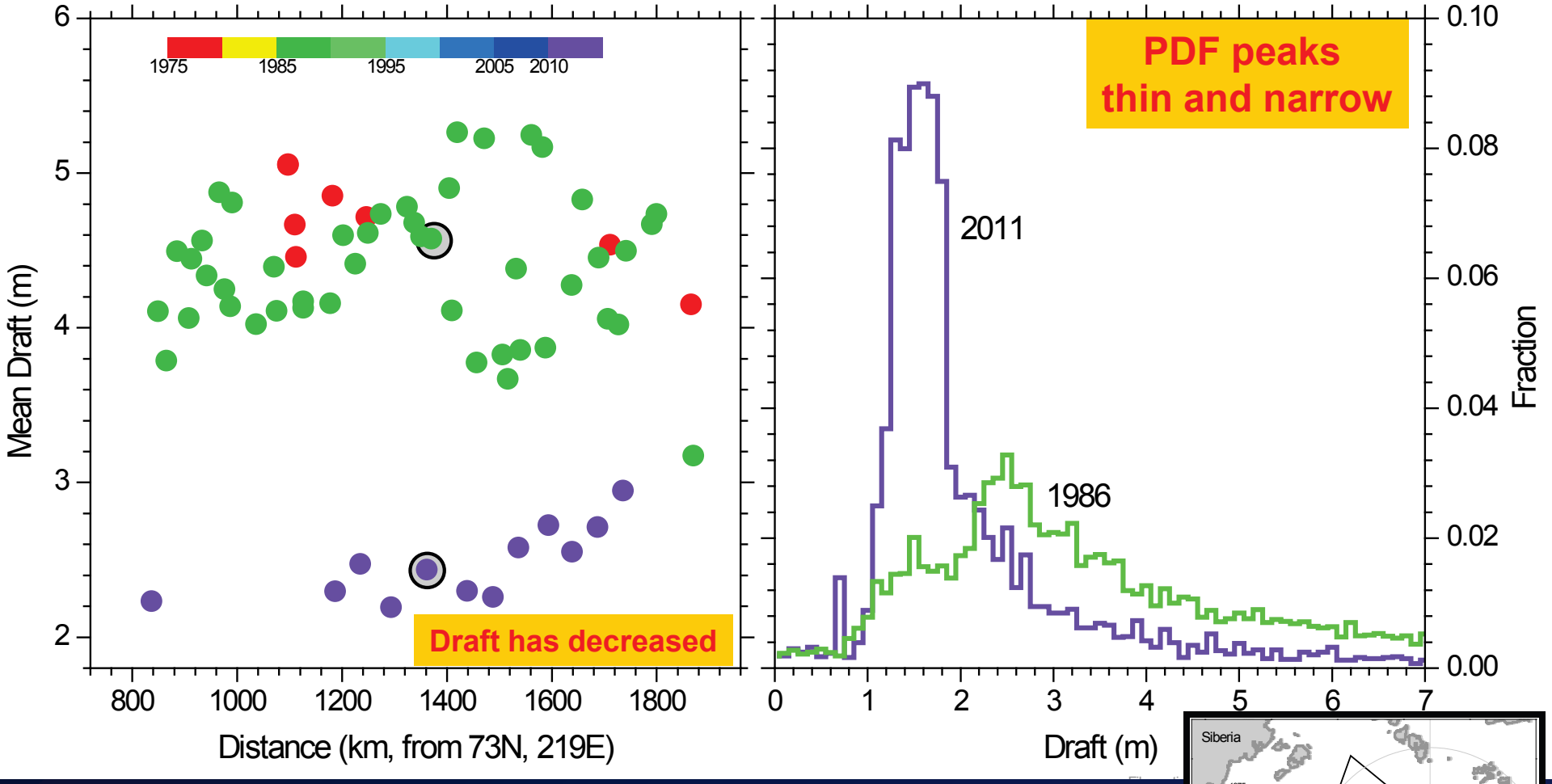


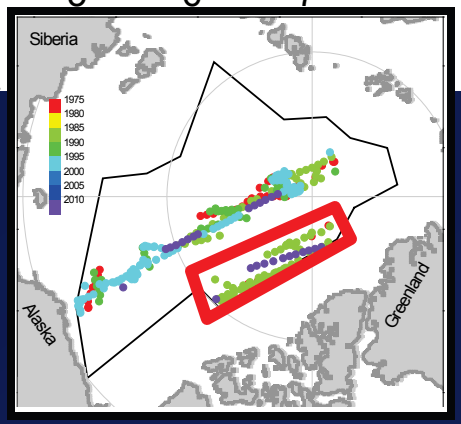
7. Central Basin Corridor



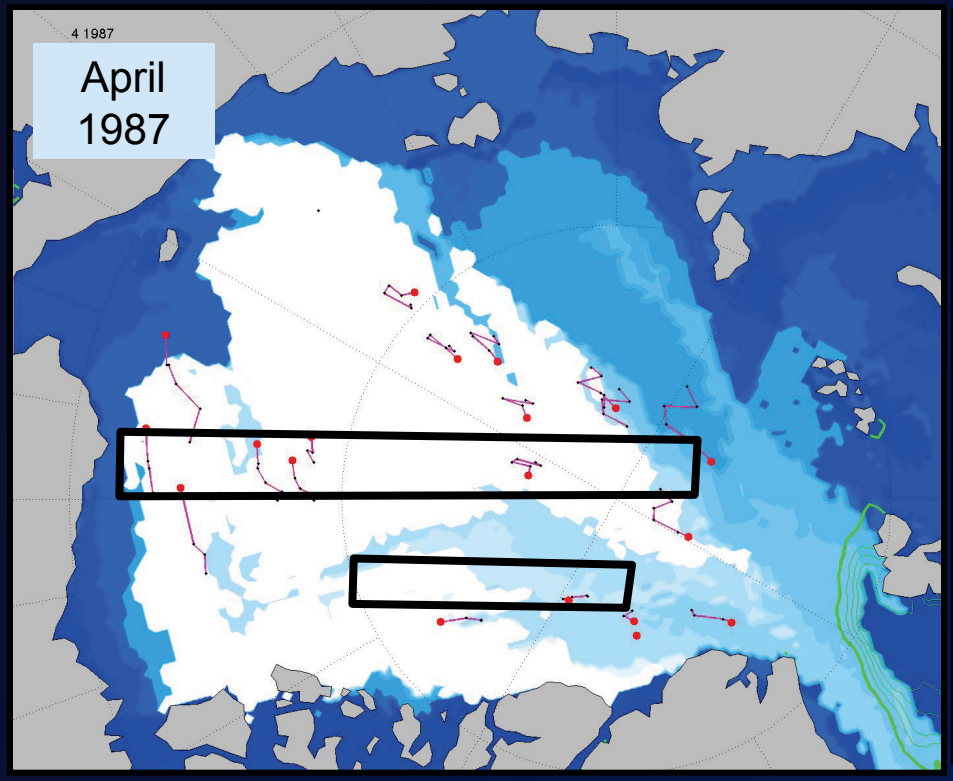


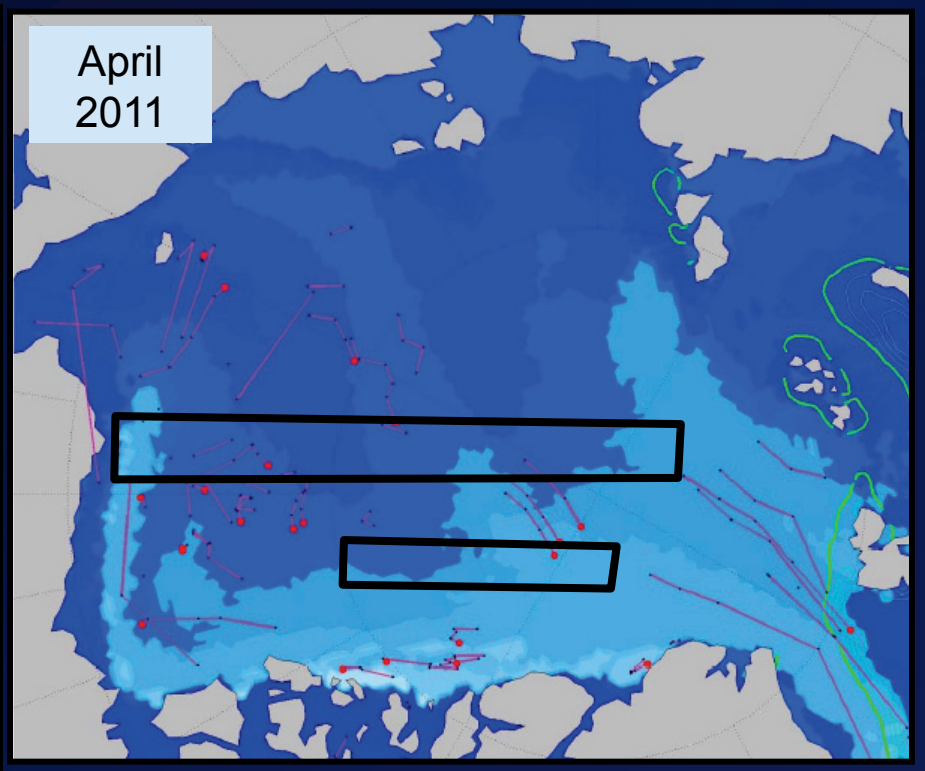
8. Archipelago Corridor





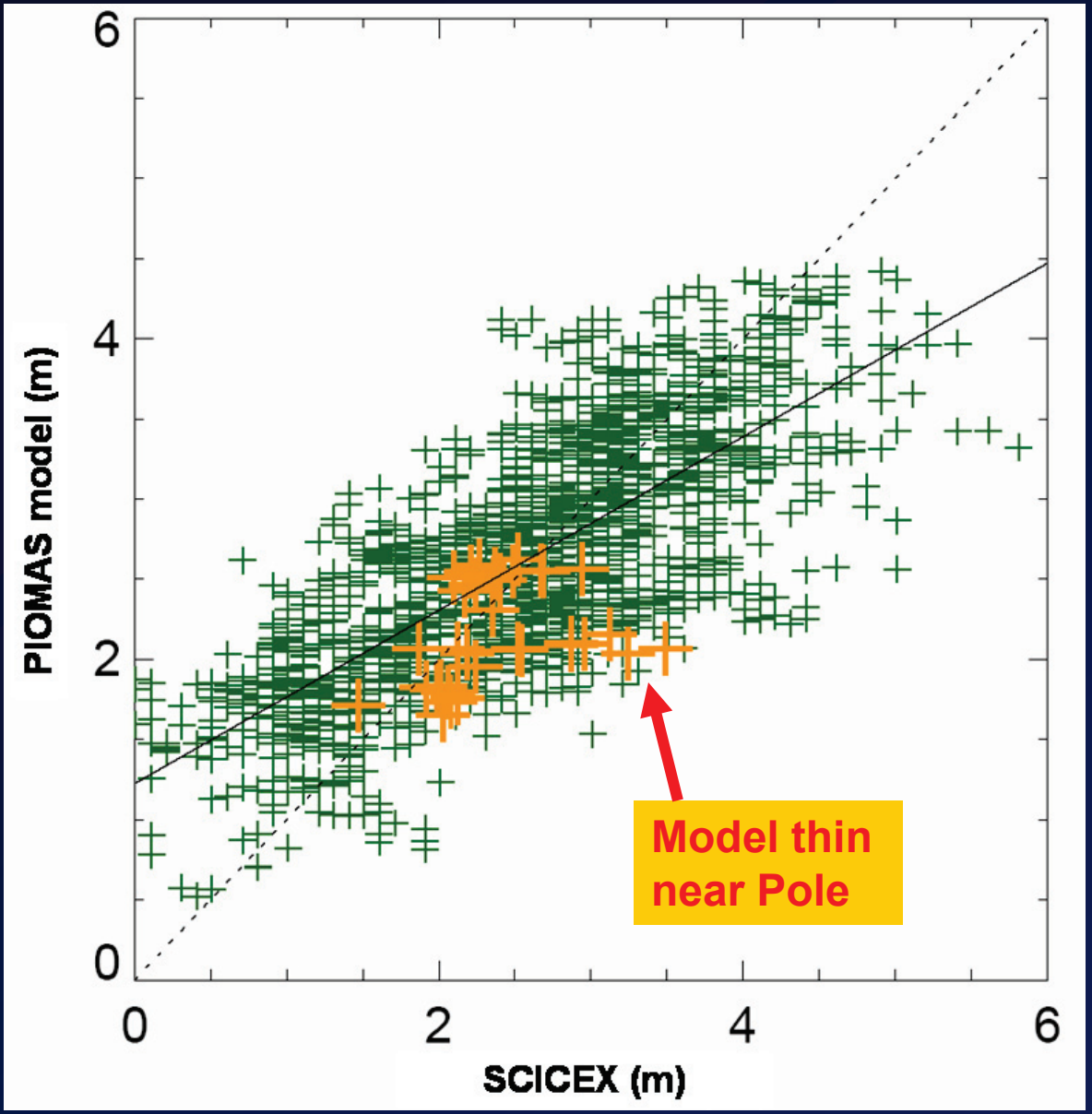
9. Ice Age in Corridors



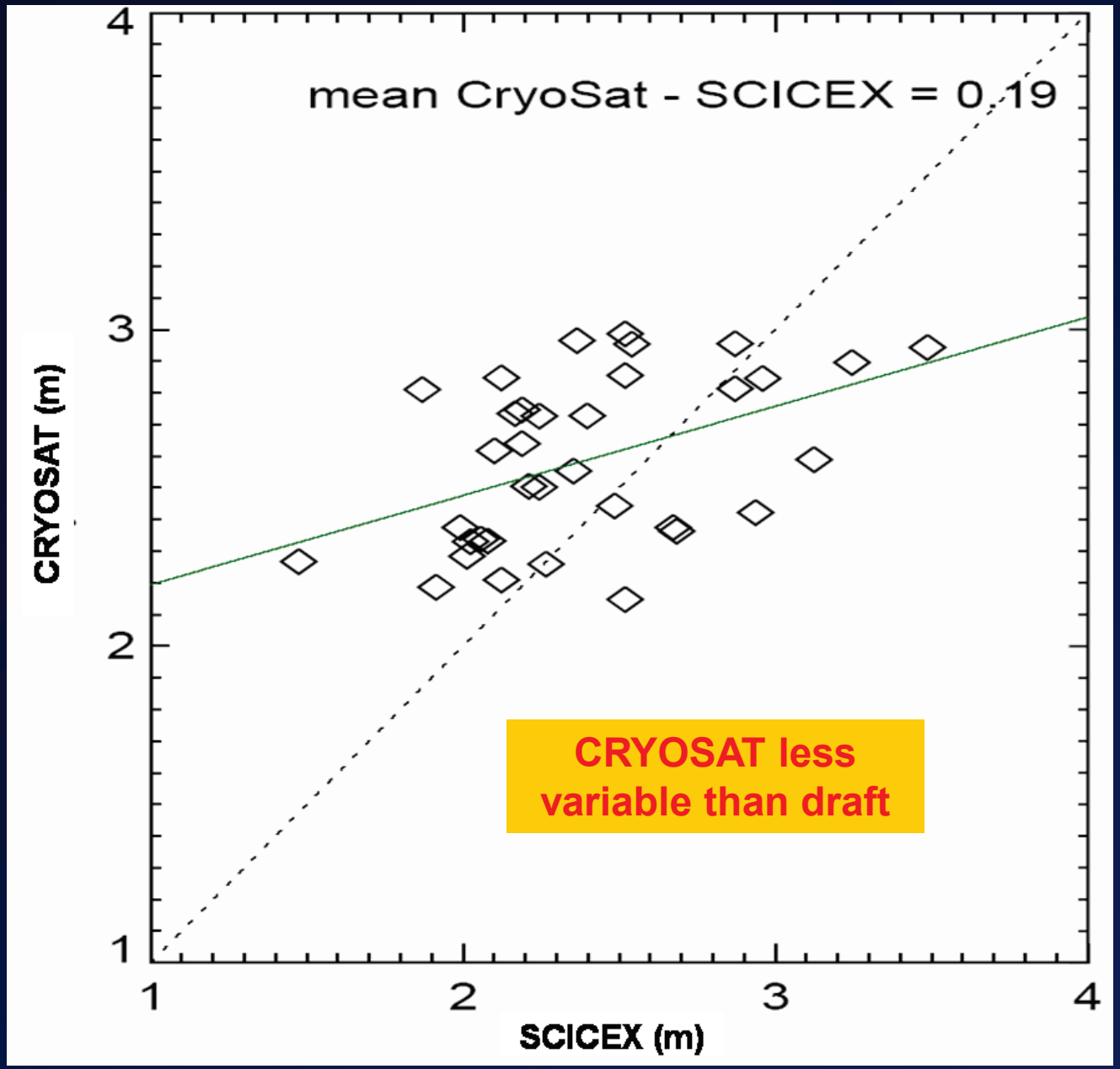


Ice age has decreased in both corridors

10. 2011 Model Comparison



11. 2011 CRYOSAT Comparison



12. 2011 draft data

Ice draft decreased by 1 to 2 meters over the last 20 years.

Thickness distributions consistent with decrease in ice age.

Good agreement with PIOMAS modeled thickness.

Generally good agreement with CRYOSAT but with CRYOSAT showing less variability than the draft data.

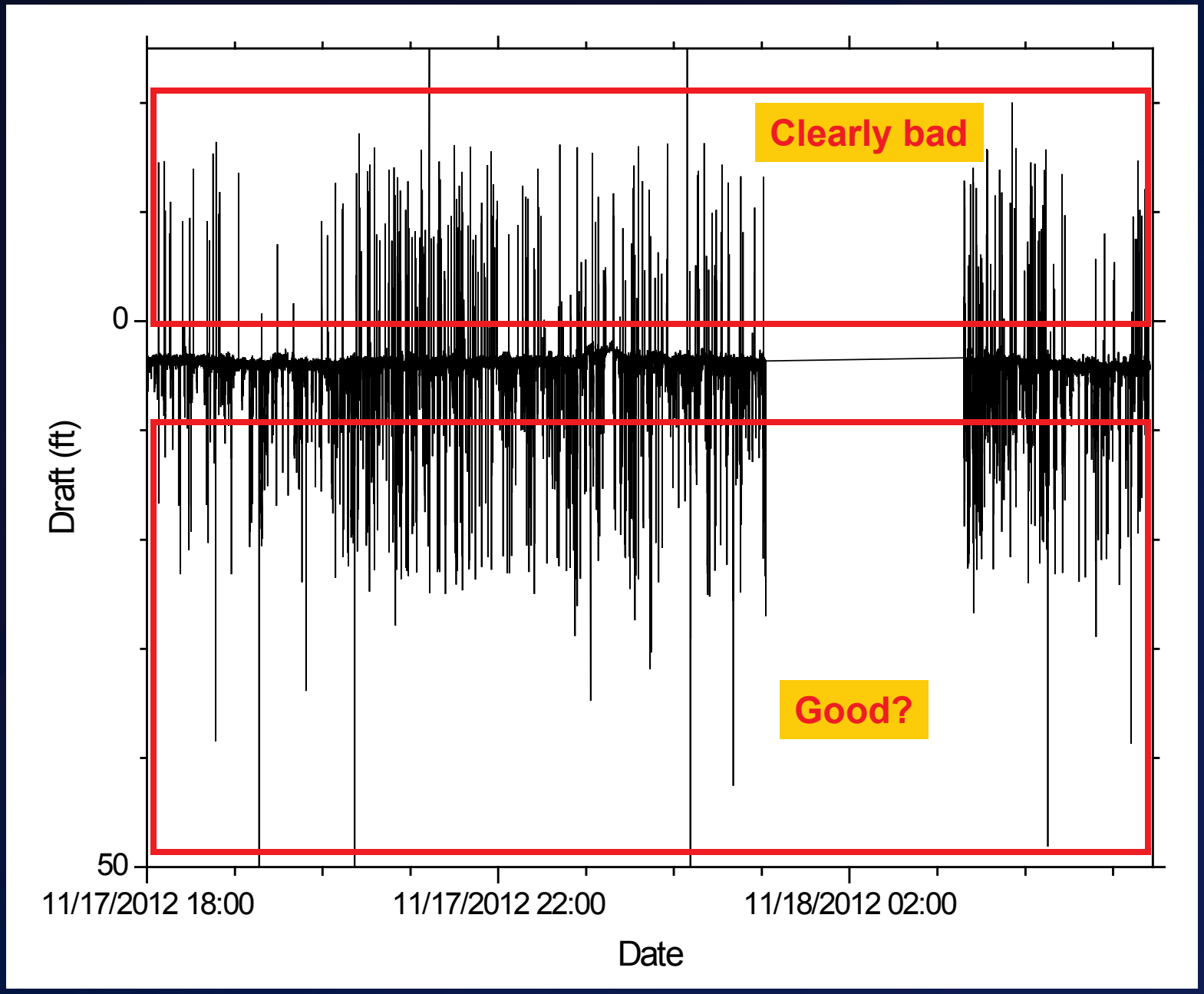
PIOMAS and CRYOSAT thinner than draft data near Pole.

13. 2012 draft data

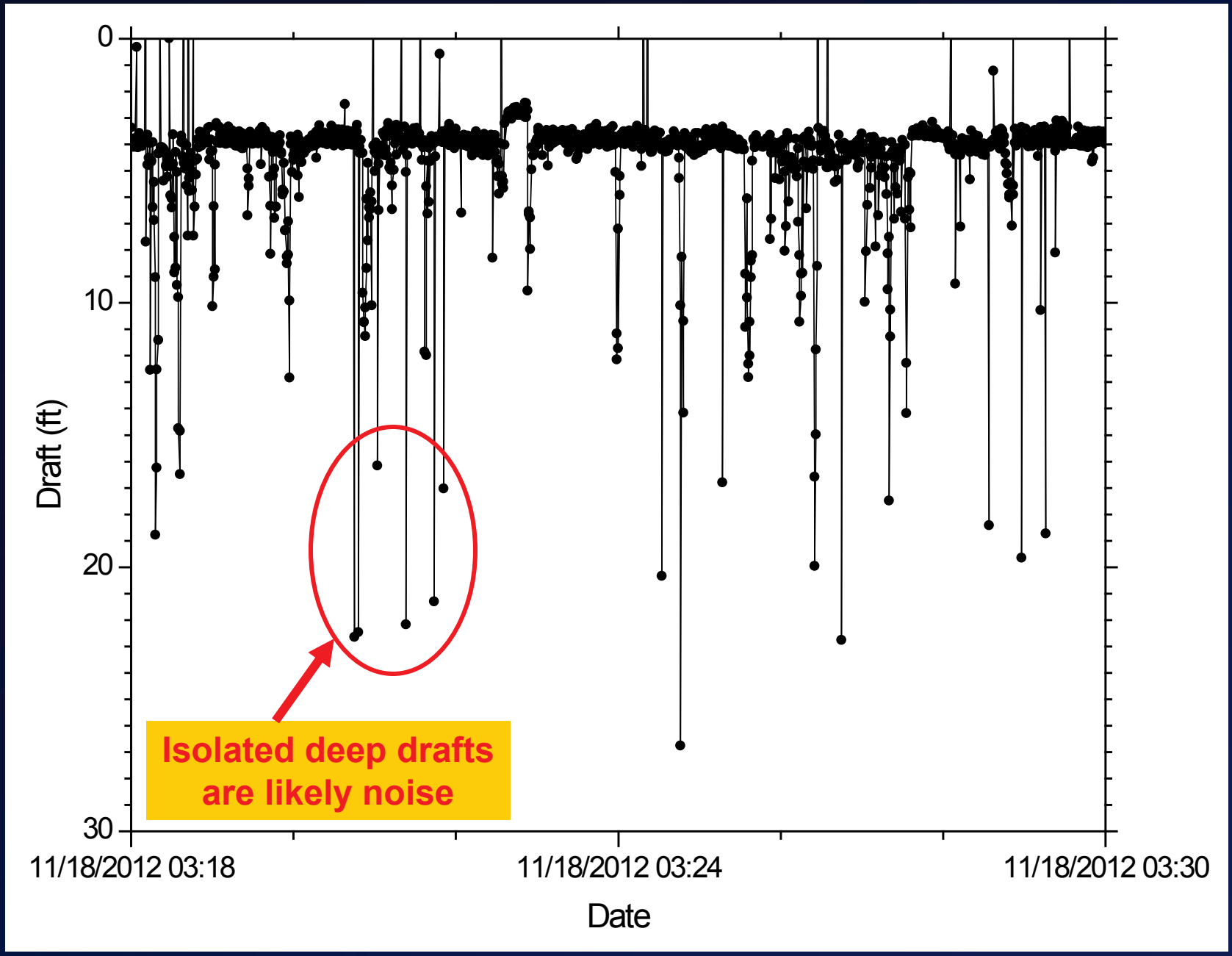
2 segments

- 11/17 to 11/18 – 10 hours at 19 knots
- 11/22 – 30 minutes at 13 knots

14. 2012 draft data



15. 2012 draft data



16. 2012 Draft Data

One useable segment

- Looks mostly like flat FY ice

Isolated deep drafts could possibly be filtered

- Not clear how effective this would be