SCICEX ice draft priorities

Compiled by Mark Wensnahan and Terry Tucker

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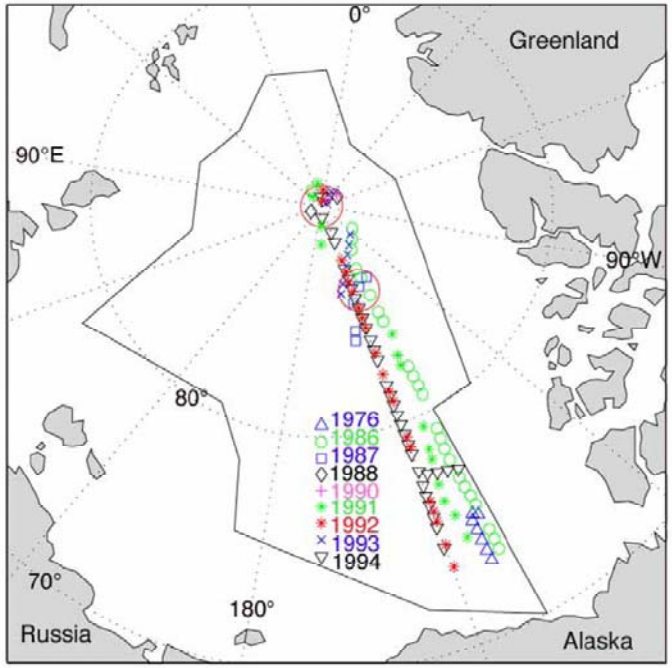
Slower, shallower sampling

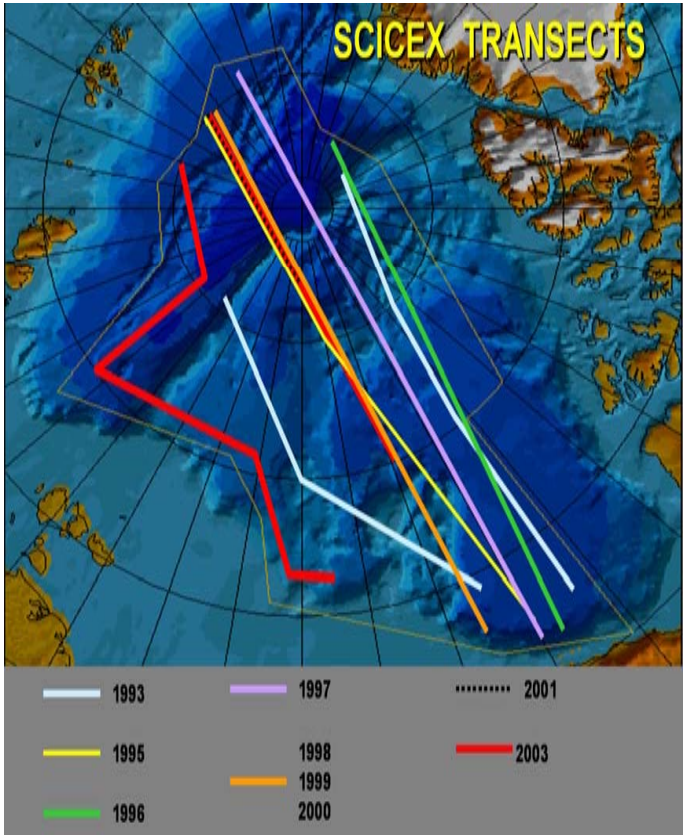
- Ideally all data would be taken at 14 knots and 440ft
  - – Higher quality data at slower speeds and shallower depths

- As a fallback 50 km samples, at 14 knots and 440ft and at regular intervals
  - 140 minutes per sample or ~70 minutes more than running fast and deep
  - this includes 10 minutes on either end to change speed and depth
  - number of samples per transect ~6(?)

Two historical tracks

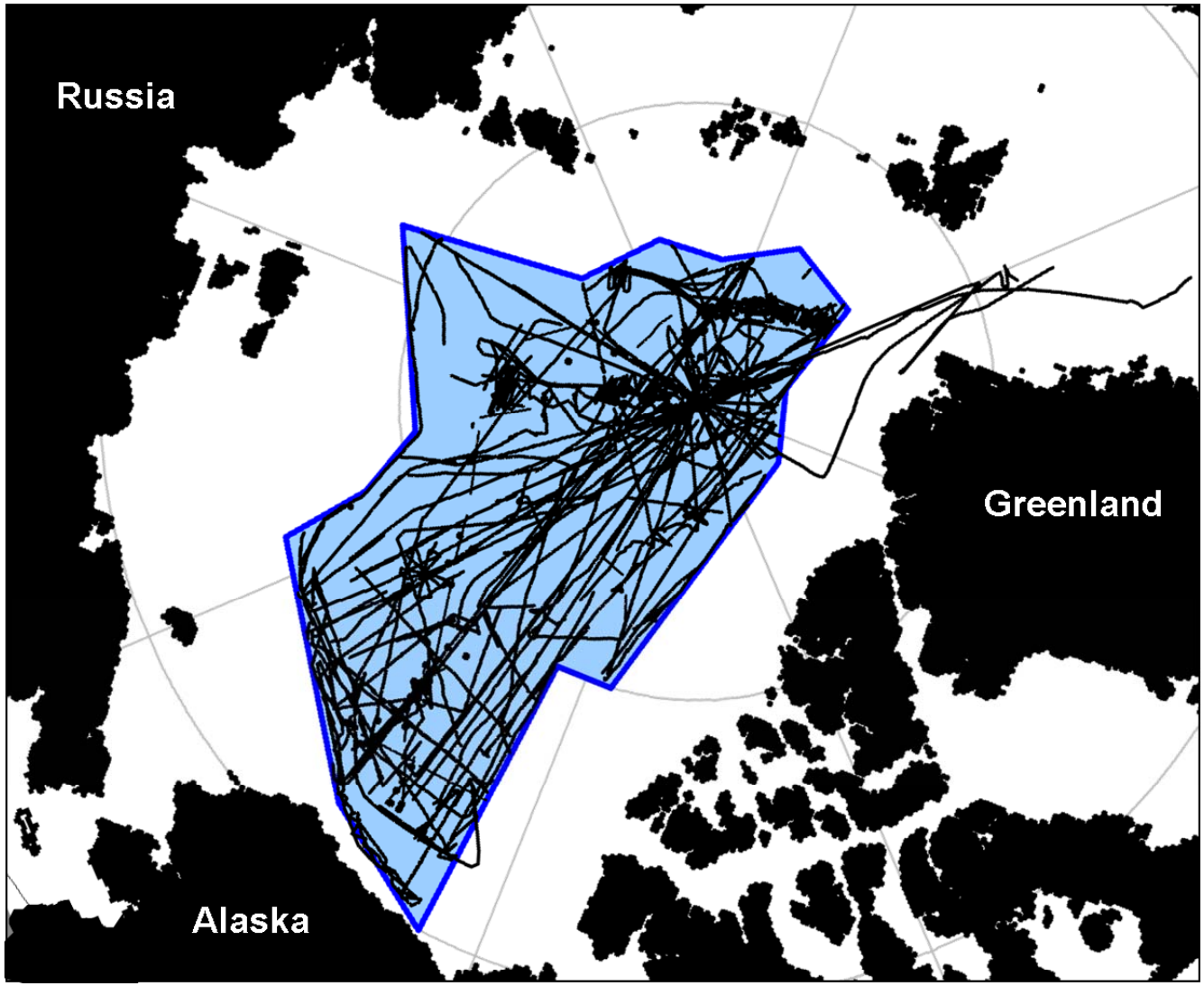
- Two transect routes have received repeat coverage:
- Mid 80s to mid 90s - sbout longitude 150W.
- Late 90s shifted to a parallel track to the west.
- Center of the Canada Basin or center of the Beaufort Gyre typically containing some of the oldest multiyear ice in the Arctic is important to survey





- Both tracks are valuable.
- Older transect route provides data on during large changes in the ice pack related to the AO in the late 80s and early 90s.
- Newer transect route provides the better documentation of recent changes.
- Might do a mix of the two based on time available.

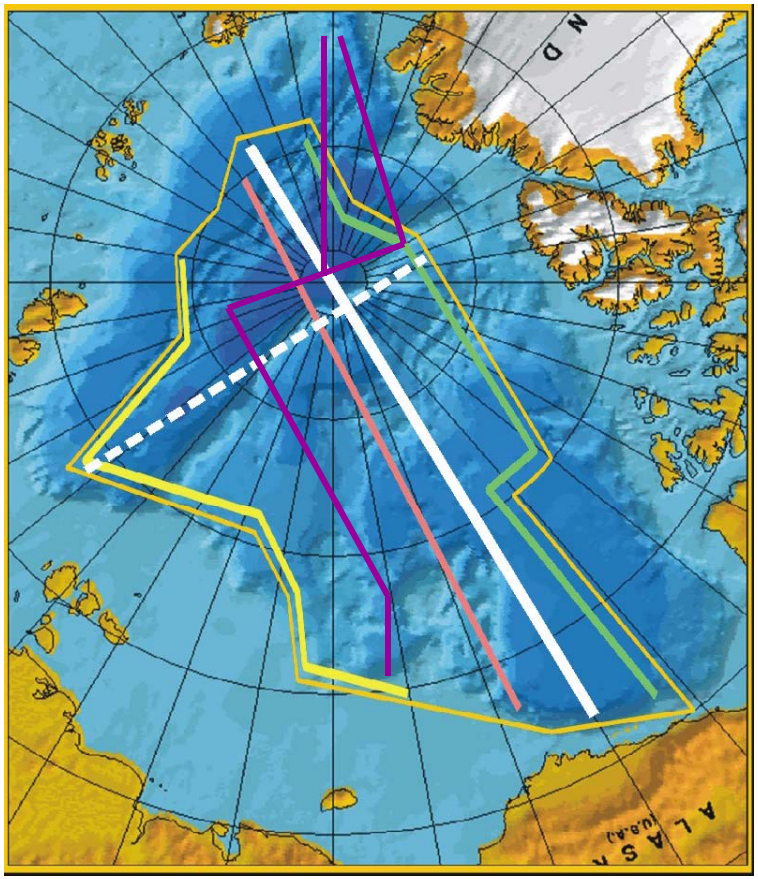
Pole coverage



• Priority should be to continue observation around the Pole.
• Greatest historical coverage (though not necessarily the most interesting ice area)

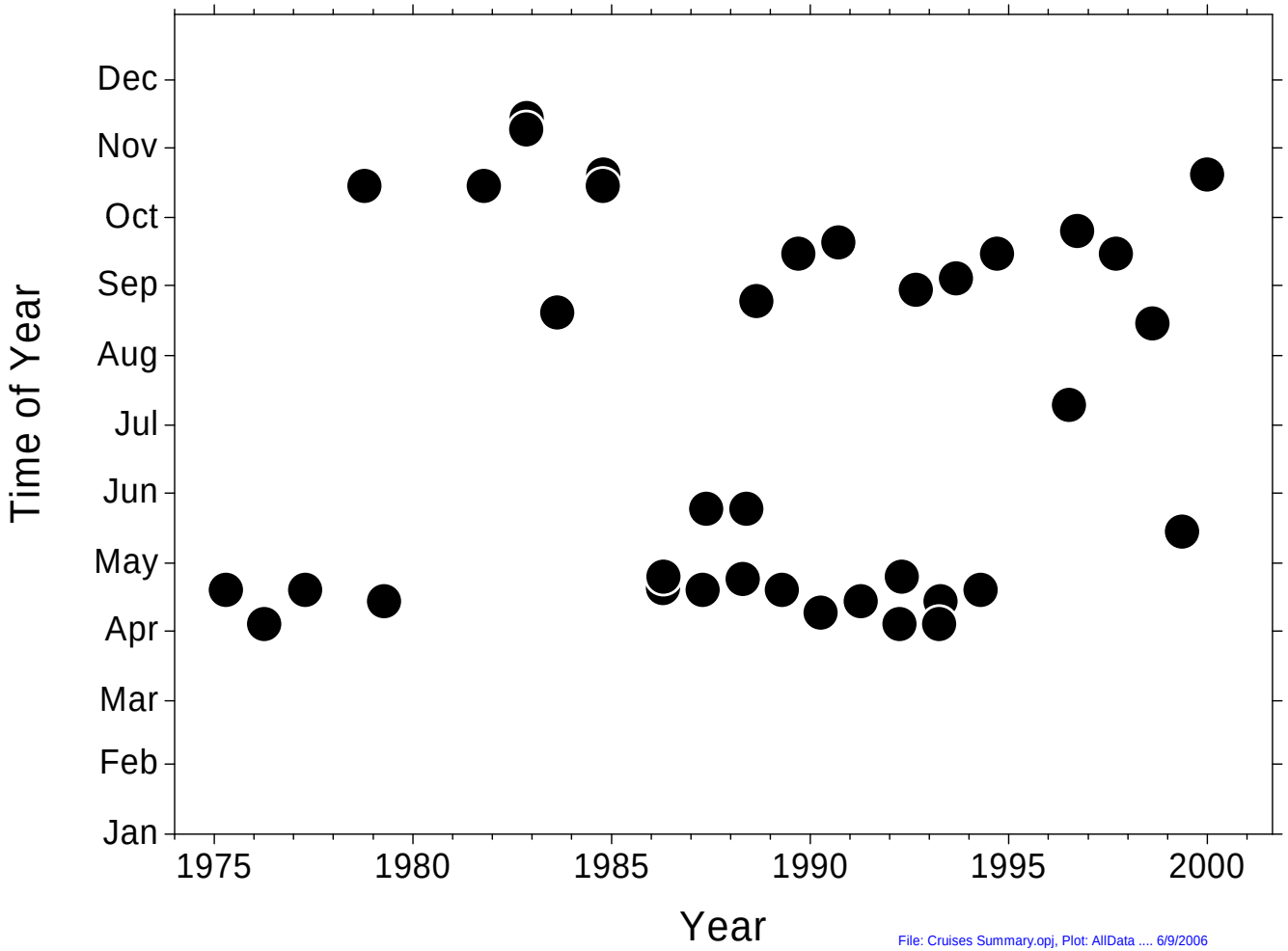
Perpendicular sampling

• Priority should also be to sample perpendicular to the standard transect route on a regular basis.
• Either a single run from the Canadian archipelago to Russia (white dashed line below) or multiple runs at different locations.



Seasonal sampling

- Most historical data in late Apr to early May and late Sep - early Oct.
- This is ideal as it covers the periods of approximate ice maximum and minimum thickness. Less useful is mid-summer data as there is a limited historical record for that time period.



Equipment testing

- Equipment testingis particularly important as draft recording systems change in the next few years. If possible tests need to be performed with concurrent recording using the older OD-style paper charts and newer style charts and digital recording. This is of course contingent and the feasibility of such testing
- Time should be made to do runs over the same area at high speeds and depths and at the more traditional 14 knots and 440 ft. This would allow us to better assess data quality for fast and deep data. It would preferable to sample an area rather than a single straight-line run. This could be done at the next ice camp.

Data acquisition requirements

Where possible it is best to have a record of the full return (including signal strength) from the sonar rather than just the first return depth. The full return makes it far easier identify open water and to identify and expunge noise from the data. In the past this capability was through the OD-style charts. As these chart recorders are phased out, it is unclear if anything equivalent, either analog or digital, is available to take its place.

Data requirements for particular media include:

Curvilinear charts only

- time marks at least every half hour
- notations of time breaks on chart
- notes of unusual events that impact chart data (e.g. rezeroing chart, changes in sound speed setting, problems with stylus)

Digital data

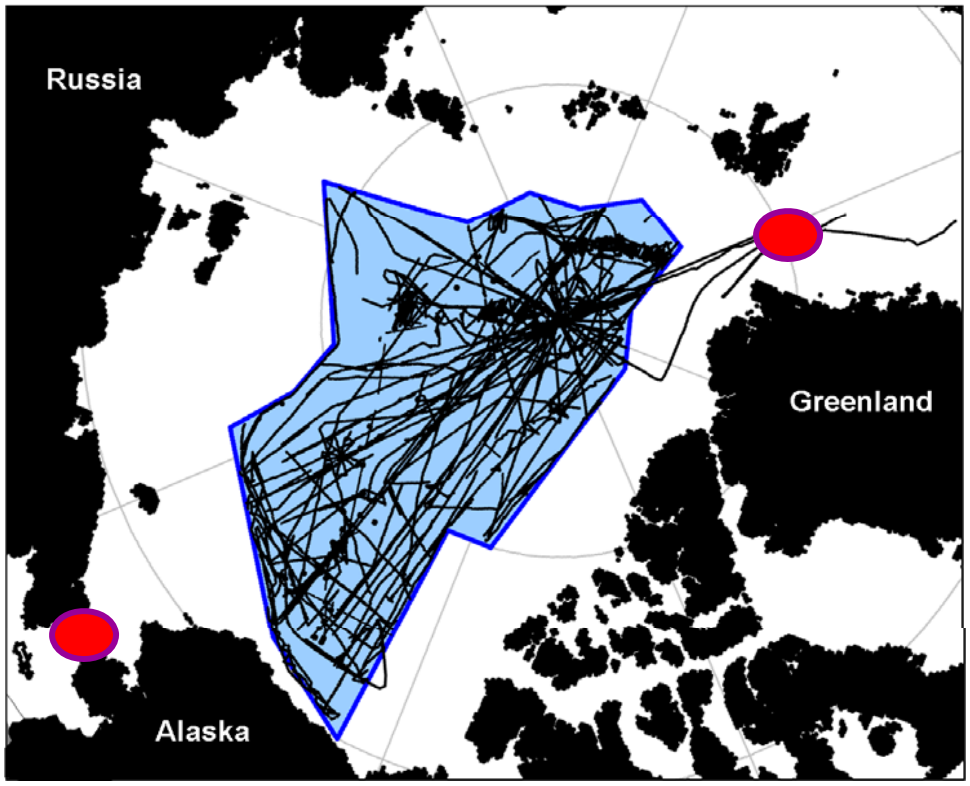
- Digital data processing is much better if the full return is somehow recorded, either on chart or perhaps digitally.

All

- Position data at least every half hour
- Course, speed and depth at least every half hour
- Changes in course, speed and depth when ordered (and hopefully when completed)

Transit (running fast and deep)

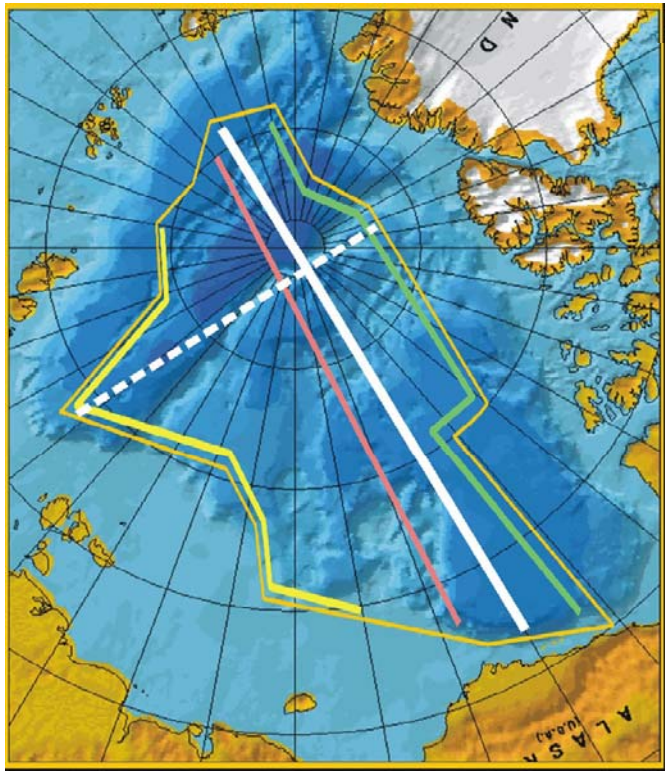
- Assume that each transit is a near-direct course between Bering Strait and Fram Strait.
  - Could conceivably collect cross-basin ice profile data
  - Pole could easily to be sampled each time.
- ½ day: 150 km on both sides of pole ≈ 12 hr
- 1 day: 100 km both sides of pole (8 hr) then 400 additional km (16 hr) of 50 km segments spaced roughly at even intervals along the transit or in one continuous profile from about 87N to 83.5N.
- 2 days: 100 km on both sides of pole (8 hr) then continuous profile of 1000 km (40 hr) from 87N to about 78N.



Transect (science defined route)

Calculations based on the 150W line

- Up to 2 days: This gets you to the line only. Additional time requirements as per the transit slide.
- 3 days: From 88N 30E to about 75N 150W (1900 km, 72 hr)
- 4 days: 84N 30E to 74N 150W (2440 km, 96 hr). This is most of the white line.
- 5, 6, and 7 days: The white line plus modifications to start picking up parts of the perpendicular transect from the Canadian to the Russian side of the box. Doing most of both will require about 8 days.



An alternative simple perpendicular route

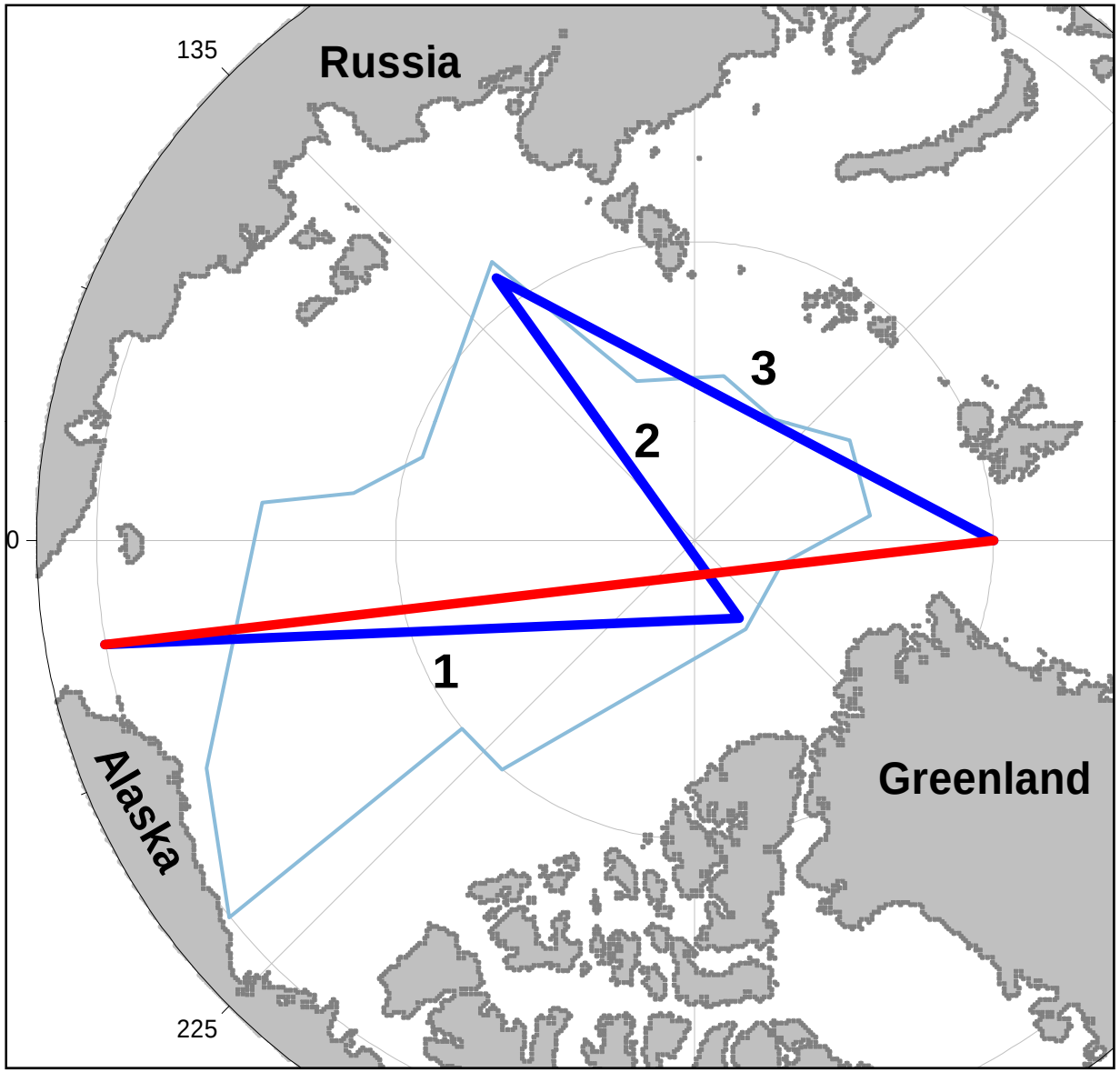
- **Straight across (red route)**
  ~3200 km

  5.1 days @ 14 knots
  3 days @ 25 knots

- **Perpendicular route (blue)**
  leg 1: 2000 km
  leg 2: 1500 km
  leg 3: 2200 km
  total: 5700 km

  9.1 days @ 14 knots
  or
  3.9 days for legs 1 and 3 @ 25 knots + 2.5 days for leg 2 @ 14 knots = **6.4 days**

- **Difference** = 2500 km
  4 days @ 14 knots or
  3.4 days @14+25 knots



An alternative simple perpendicular route

- **Straight across (red route)**
  ~3200 km or 5.1 days @14 knots
  or **3 days** at 25 knots
- **Perpendicular route (blue)**
  leg 1: 2000 km
  leg 2: 1500 km
  leg 3: 1000 km

  total: 4500 km
  7.5 days at 14 knots
  or
  2.8 days for legs 1 and 3 at 25 knots + 2.5 days for leg 2 at 14 knots = **5.3 days**
- **Difference**
  ~ **2.3 days** @ 14 + 25 knots