Lifetime Statistics of Most Recent Drifter Deployments (2000-2003)

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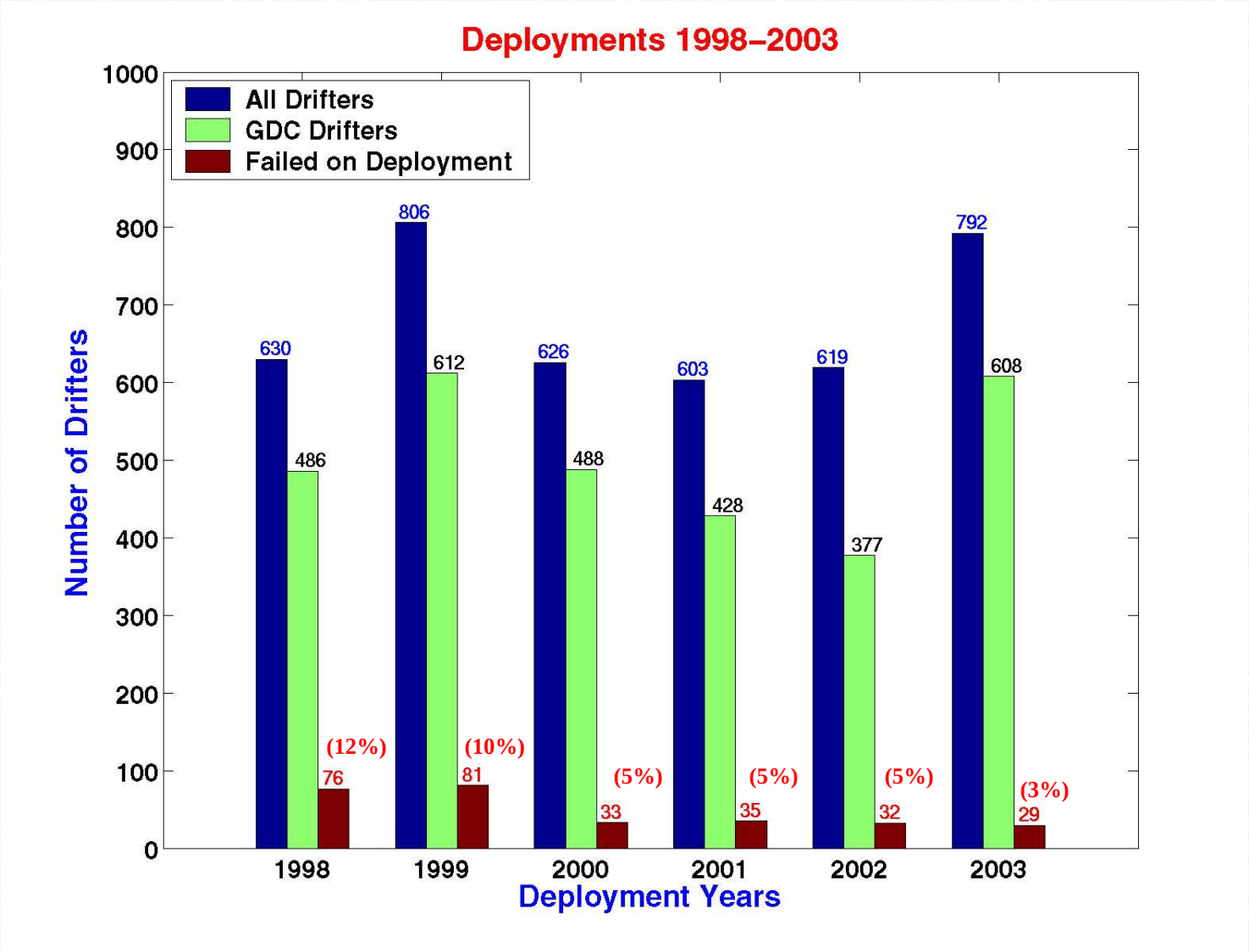
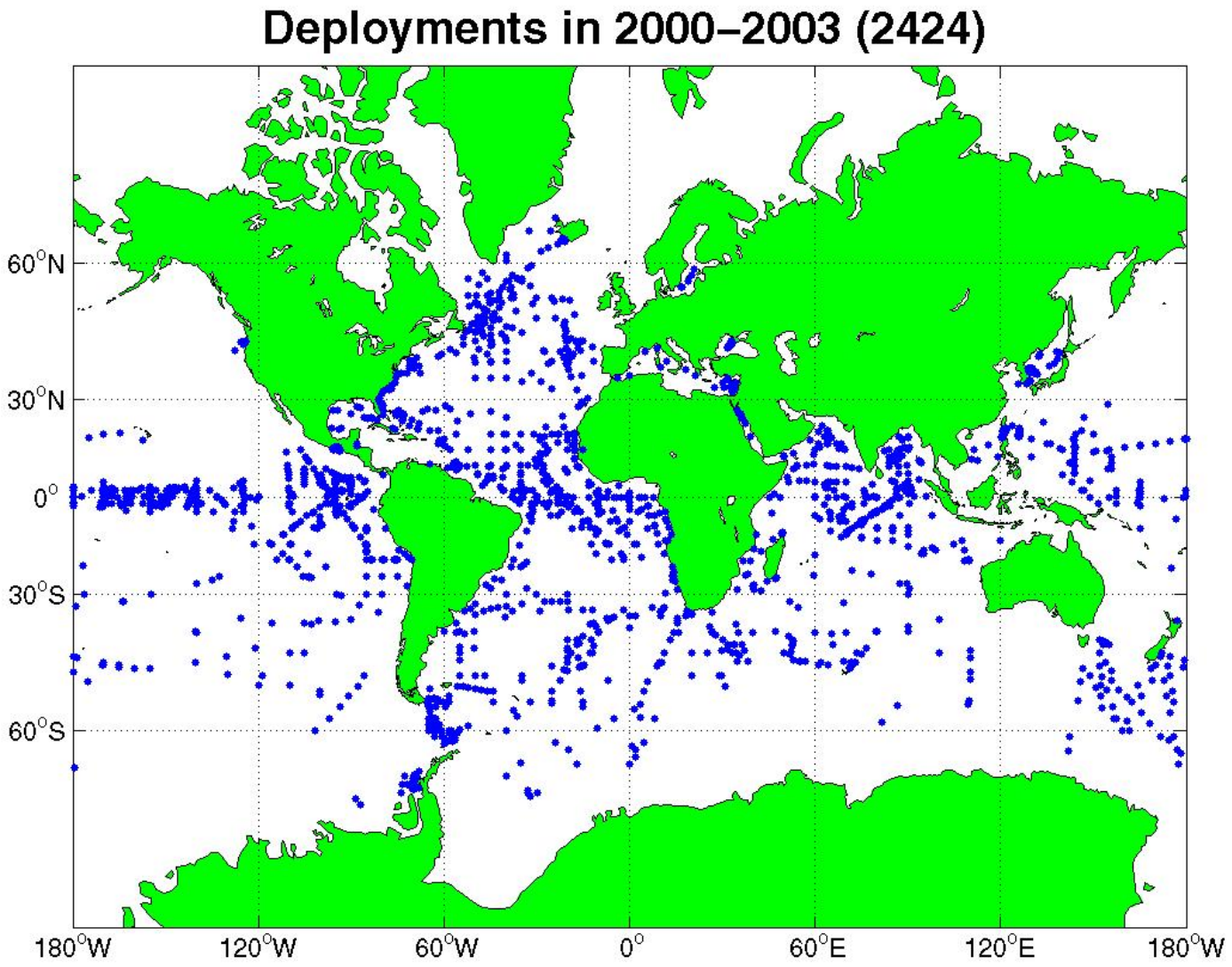
Drifters deployed between 2000-2003

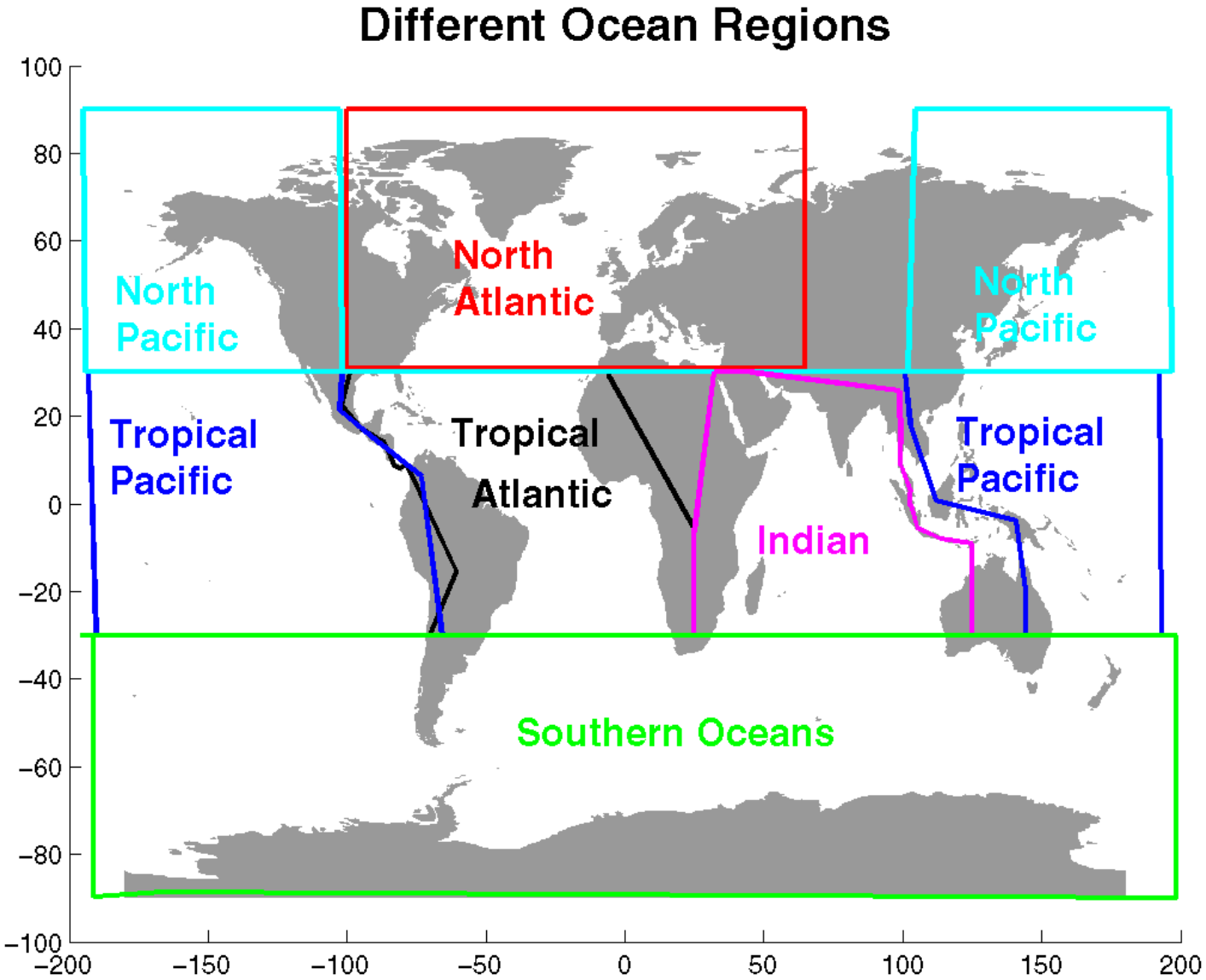
- Deployments and Failure on deployment
- Why and Where are drifters dying
- How long do drifters live
  - Half life vs. Average life
- Where do most drifters lose their drogues?
- Interesting drifter facts and tracks

How are we doing in deployments? What percent are failing on deployment?

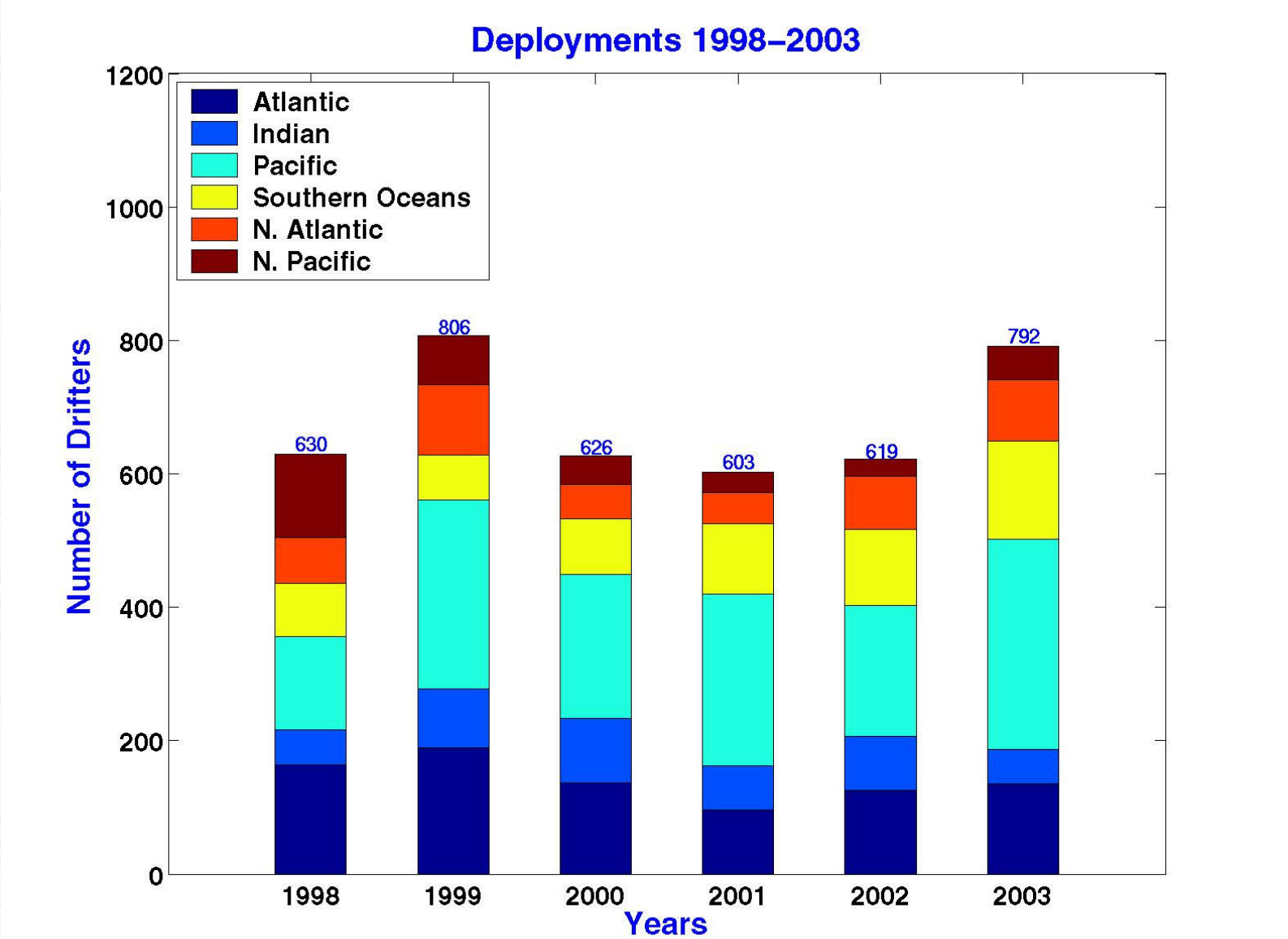


Where have drifters been deployed in the last four years?




Different Ocean Regions
North Pacific
North Atlantic
North Pacific
Tropical Pacific
Tropical Atlantic
Tropical Pacific
Indian
Southern Oceans
100
80
60
40
20
0
−20
−40
−60
−80
−100
−200
−150
−100
−50
0
50
100
150
200

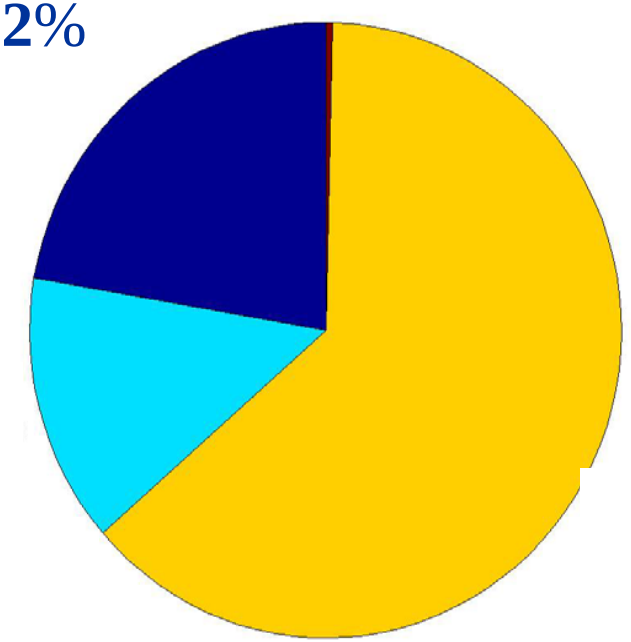
Distribution of Deployments by Regions



Distribution of Death Patterns

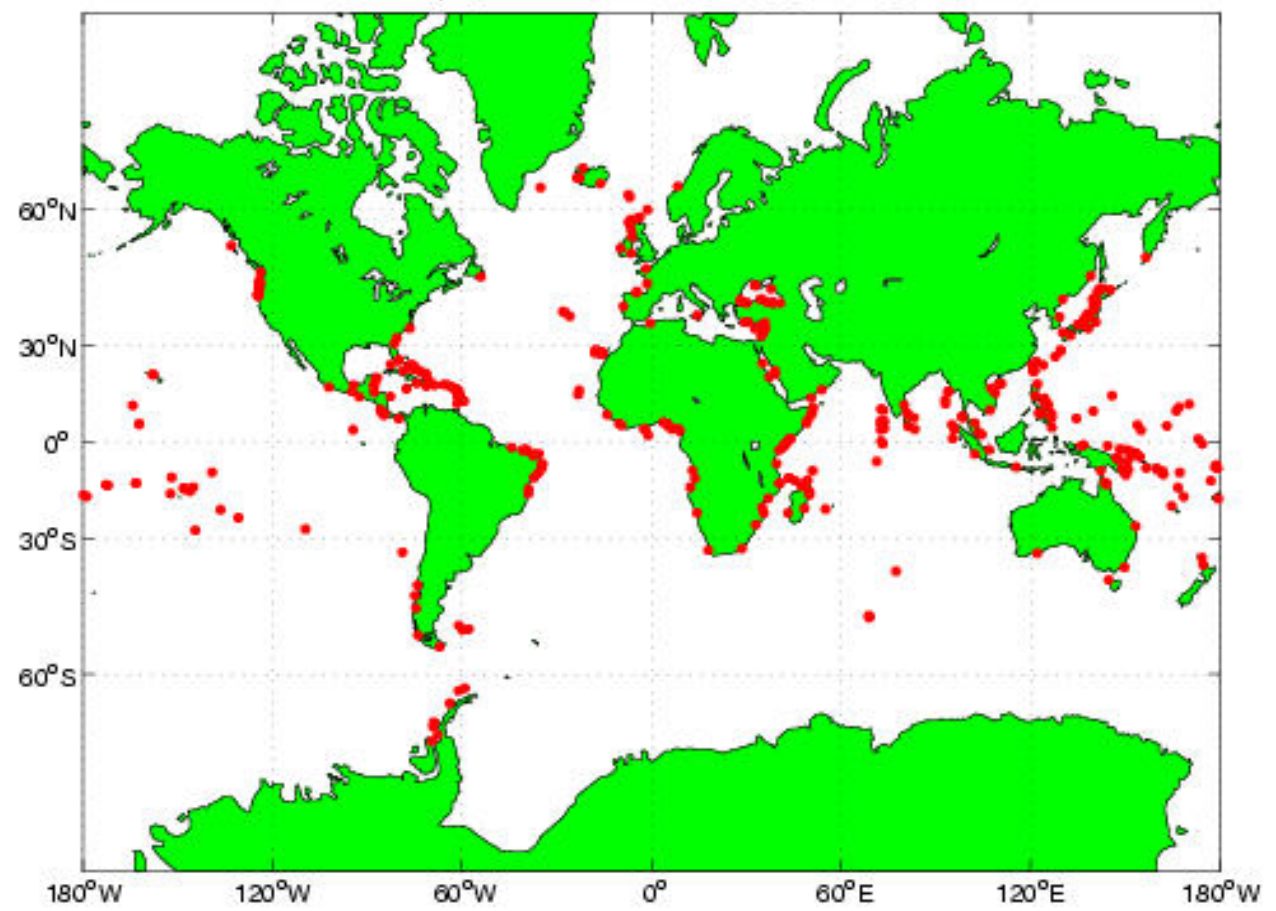
Death Codes

- **Quit:** Suddenly stopped transmitting
- **Grounded:** Ran aground
- **Picked up:** By fishing vessels, curious people



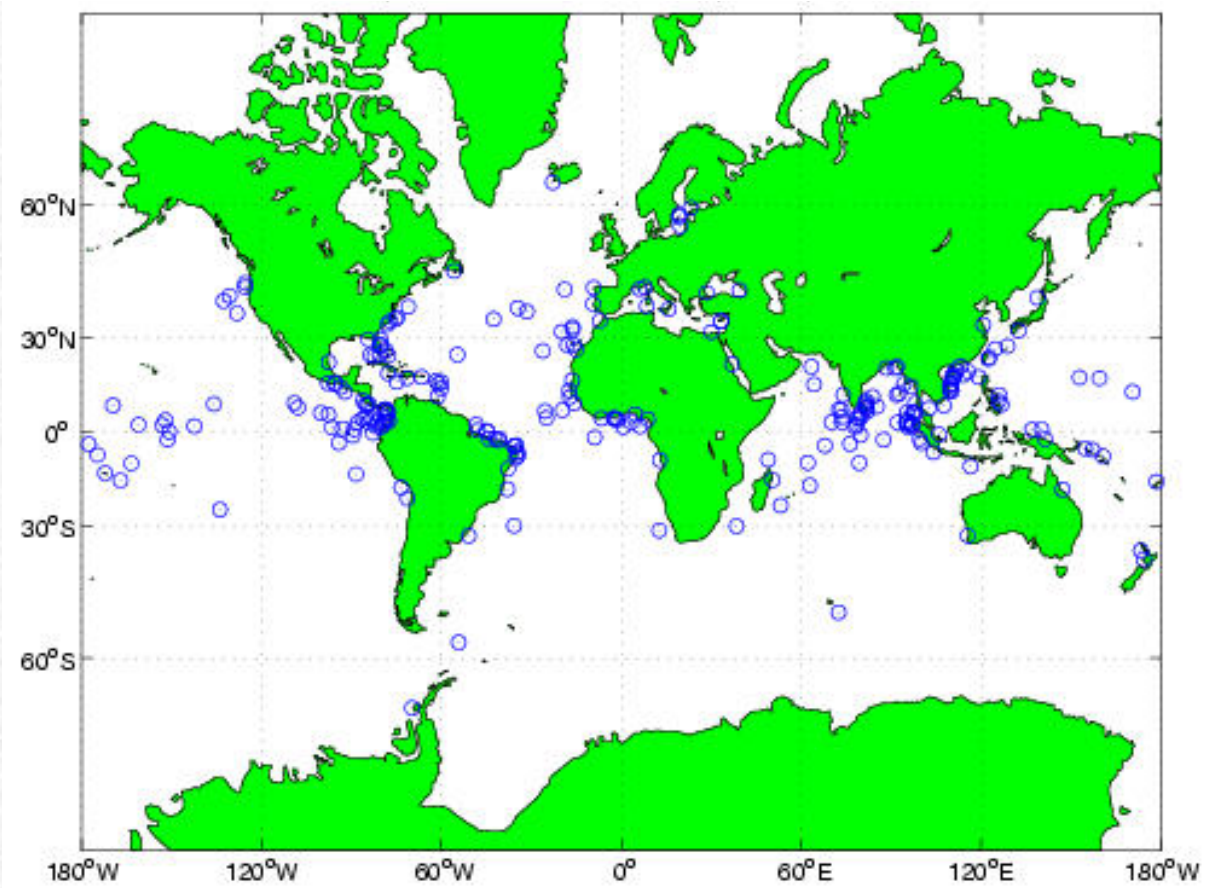
Why and Where are drifters dying?

Deployed in 2000-2003, Dead by **grounding** (22%)



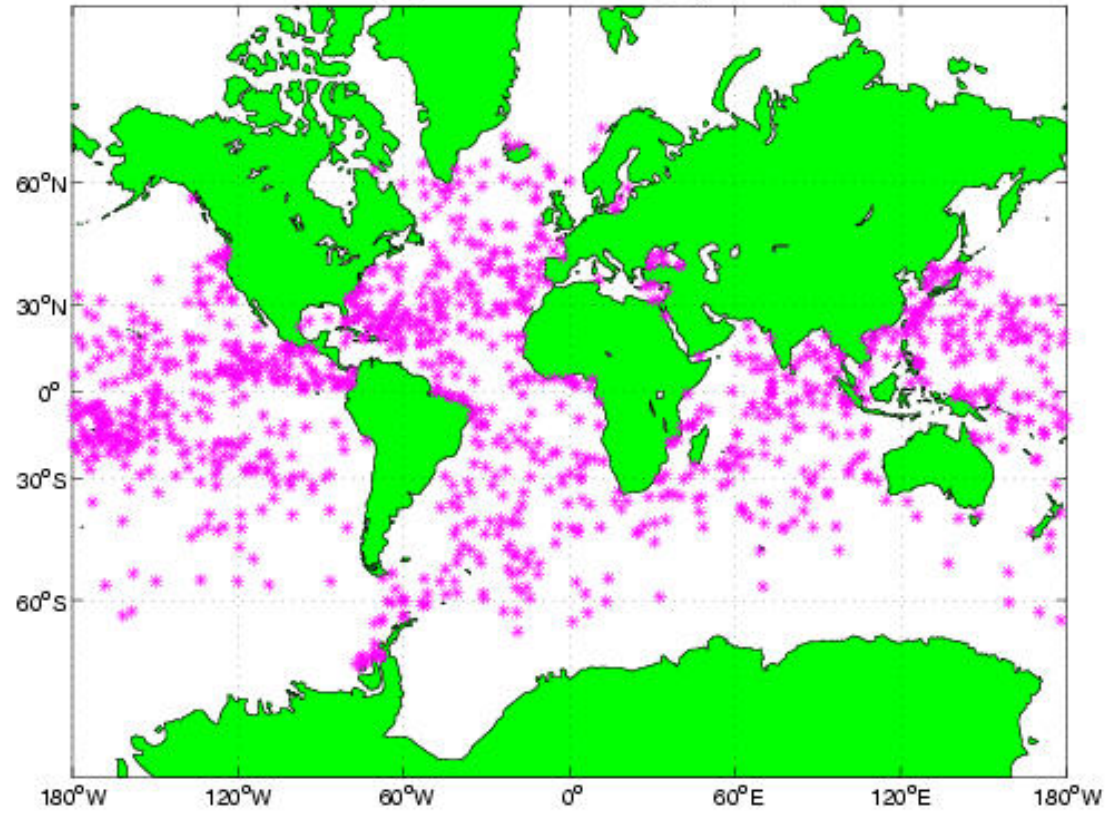
Why and Where are drifters dying?

Deployed in 2000-2003, Dead by **picked up** (14%)



Why and Where are drifters dying?

Deployed in 2000-2003, Dead by **Quit transmitting** (64%)



How long do drifters live?

Challenges we encounter in computing drifter's longevity:

Average life time for old buoys is easy to compute, because most of them are already dead.

For most recent drifters, which are still alive, this task is more difficult (ex: deployed from 2002 onward).

What do we do when trying to compute average life for them?

1) Do we ignore those still alive? (NO!)

2) Do we say they died today so we have an ending time? (NO!), we are cutting them short!

To resolve this problem, we computed **Half Life**, instead of average life, for transmitter, drogue and SST.

What is the "half life"?

A simple example for transmitter half life:

Let's suppose: **10** buoys were deployed in 2002

At the end of the year, 5 have died, and 5 are alive

- For the **dead** buoys: Compute total # days alive (end t – start t)
- For the **alive** buoys: make the # days alive = 99999
- Sort the series in ascending order
- The value in the middle of the series is the half life

10 50 100 125 **200** 99999 99999 99999 99999 99999

➔ half life is *200* ***days***.

What about the remaining 5 drifters? They are still alive today

Half life: won't change, the middle value would always be 200.

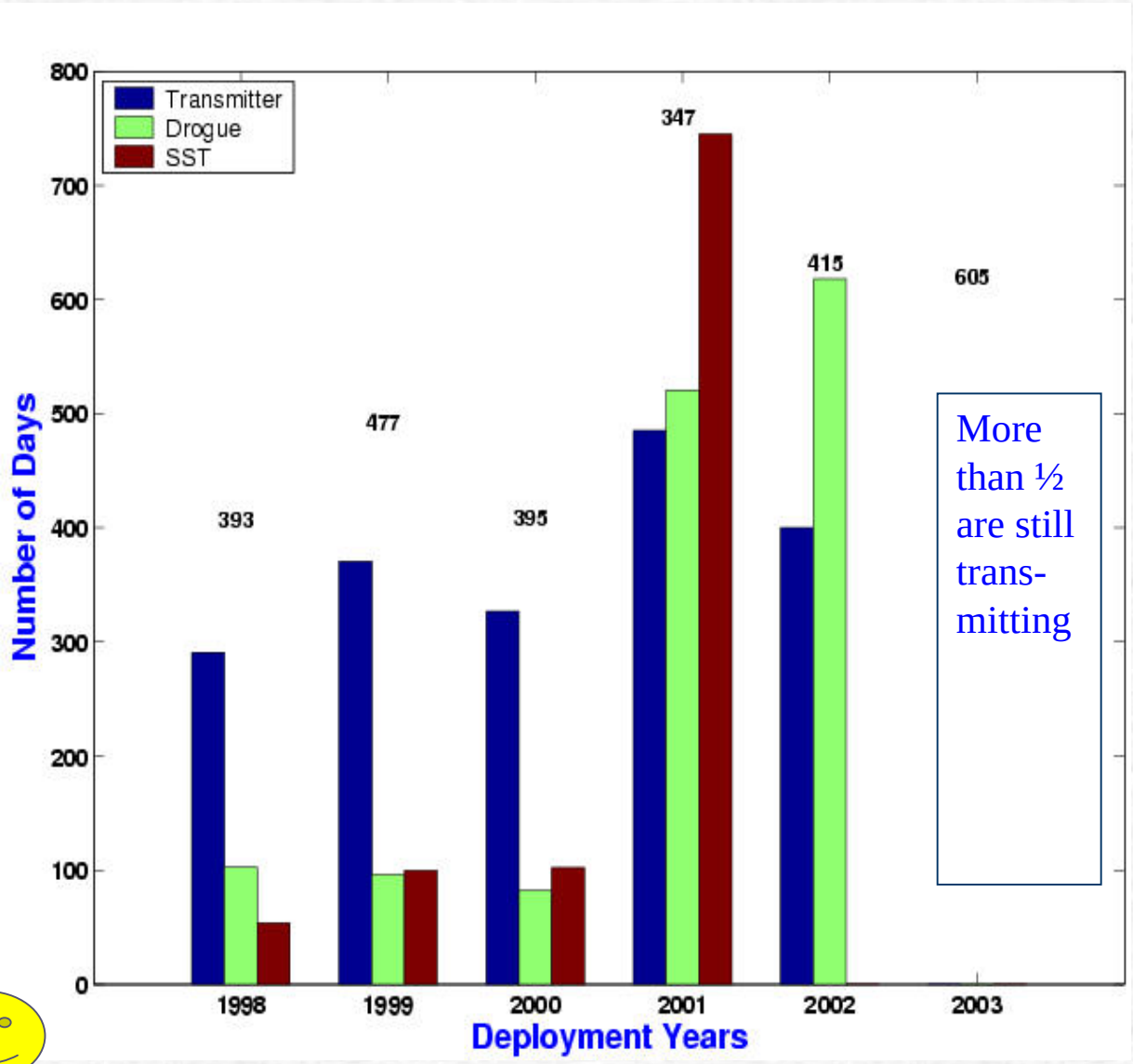
Average lifetime: will change (until all the drifters are dead)

***Note*:** half life doesn't exist if more than half are still alive.

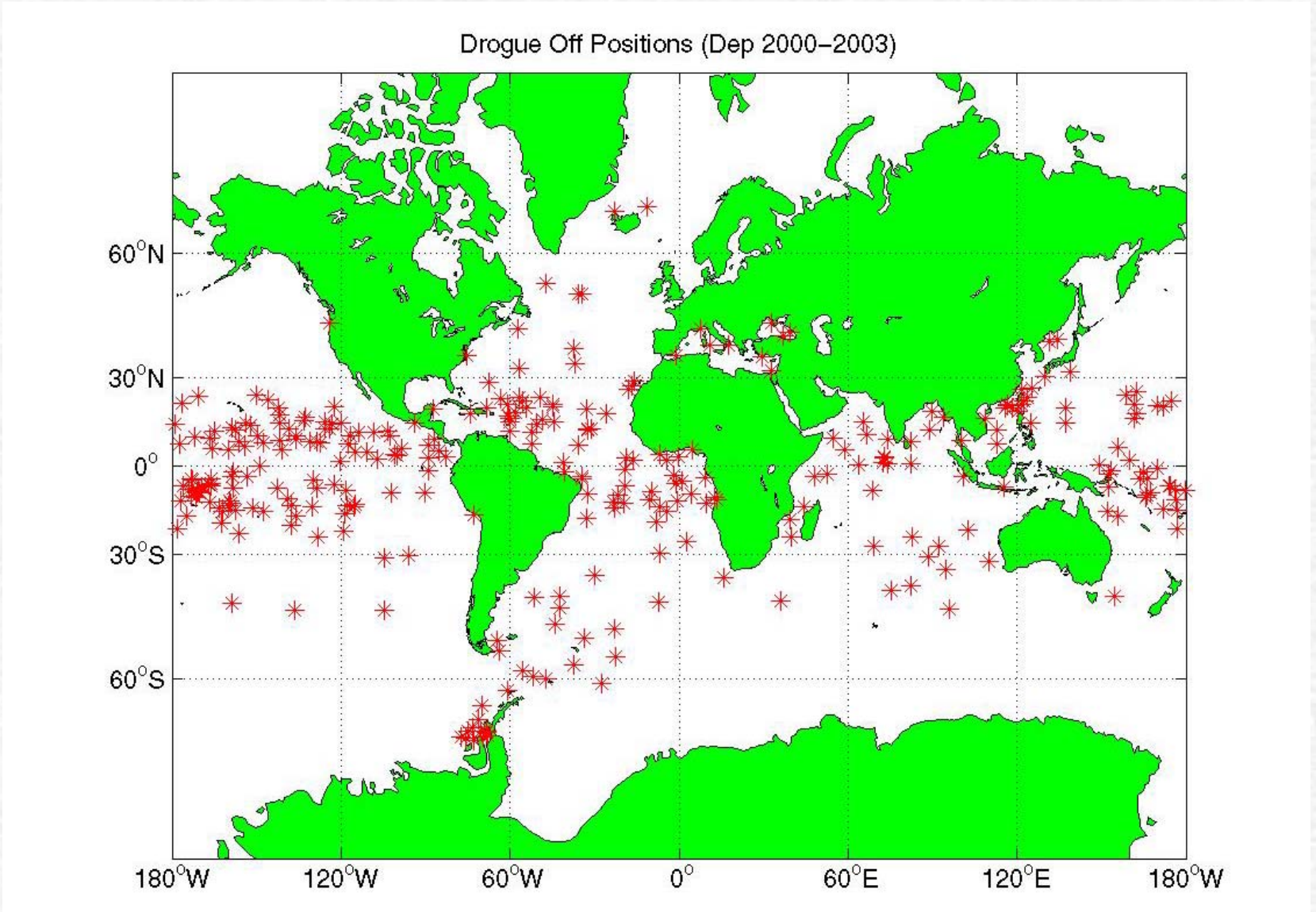
Half Life of Drifters Deployed from 1998-2003, code 0 & 3

- Years 98-00,Drogue and SST sensors lasted only 1/3 # of days transmitter lasted.
- ½ life of transmitter not computed in 2003, because more than half were still alive
- Big improvement from 98-00. Half life jumps to 400+ days in the last 3 years
- Drogue ½ life shows a real dramatic improvement 2001 onward half of buoys had drogues for more than 500 days.
- SST ½ life also improved from 2001 onward, lasting for over 2 years.

Big improvement in technology



Where do drifters lose their drogues?

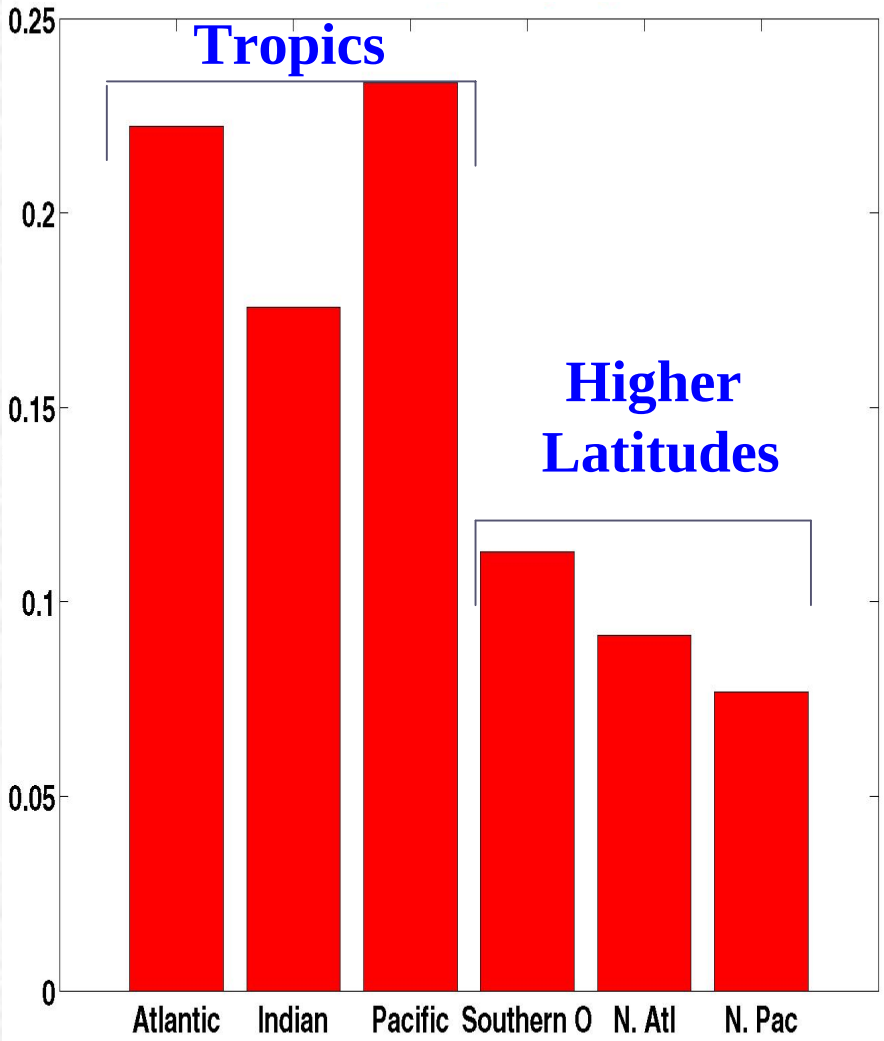


drogue lost in each region / # deployed in each region

- Larger fraction lose their drogues in the tropics versus higher latitudes.

  Are there physical or biological reasons that cause them to actually lose their drogues more quickly in the tropics than in any other regions

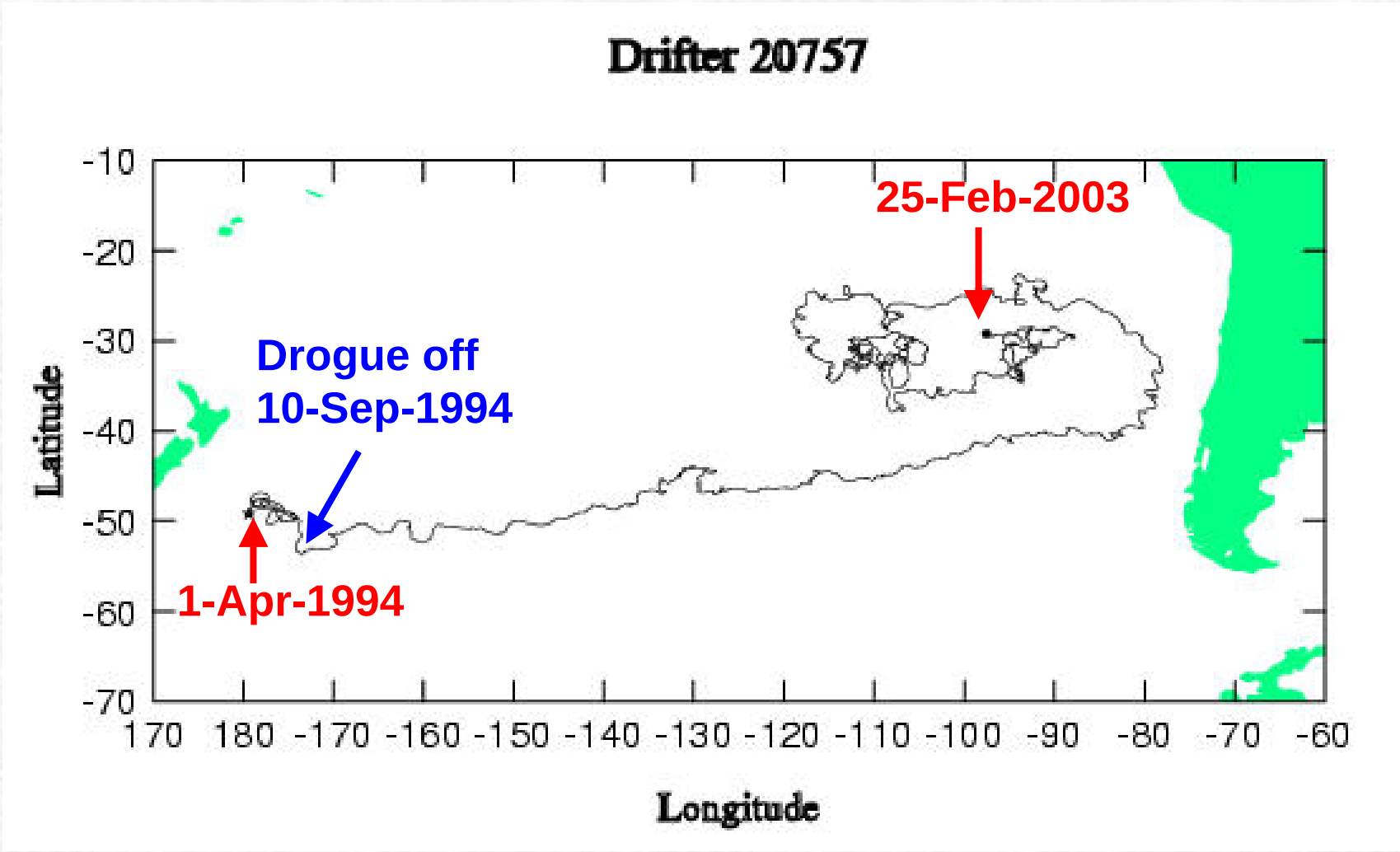
Ratios of drogue off by regions



Oldest drifter: 3,245 days = 8 years, 11 months

 # days with drogue on: 162 days = 5 months, 12 days

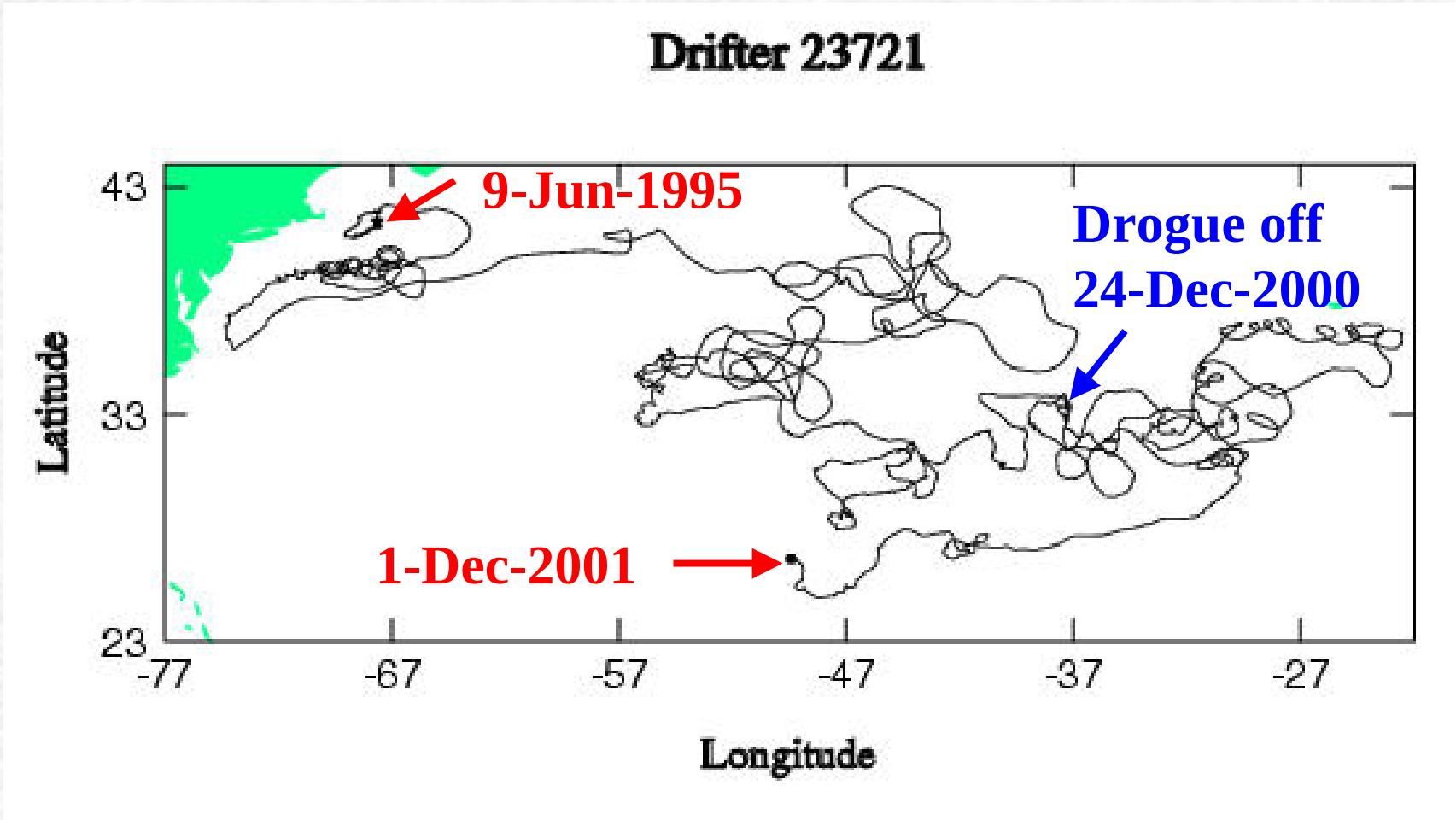
SST good to the end, Death cause: quit transmitting



Longest drogue: 2,024 days = 5 years, 6 months

 # days buoy lived: 2,366 days = 6 years, 5 months

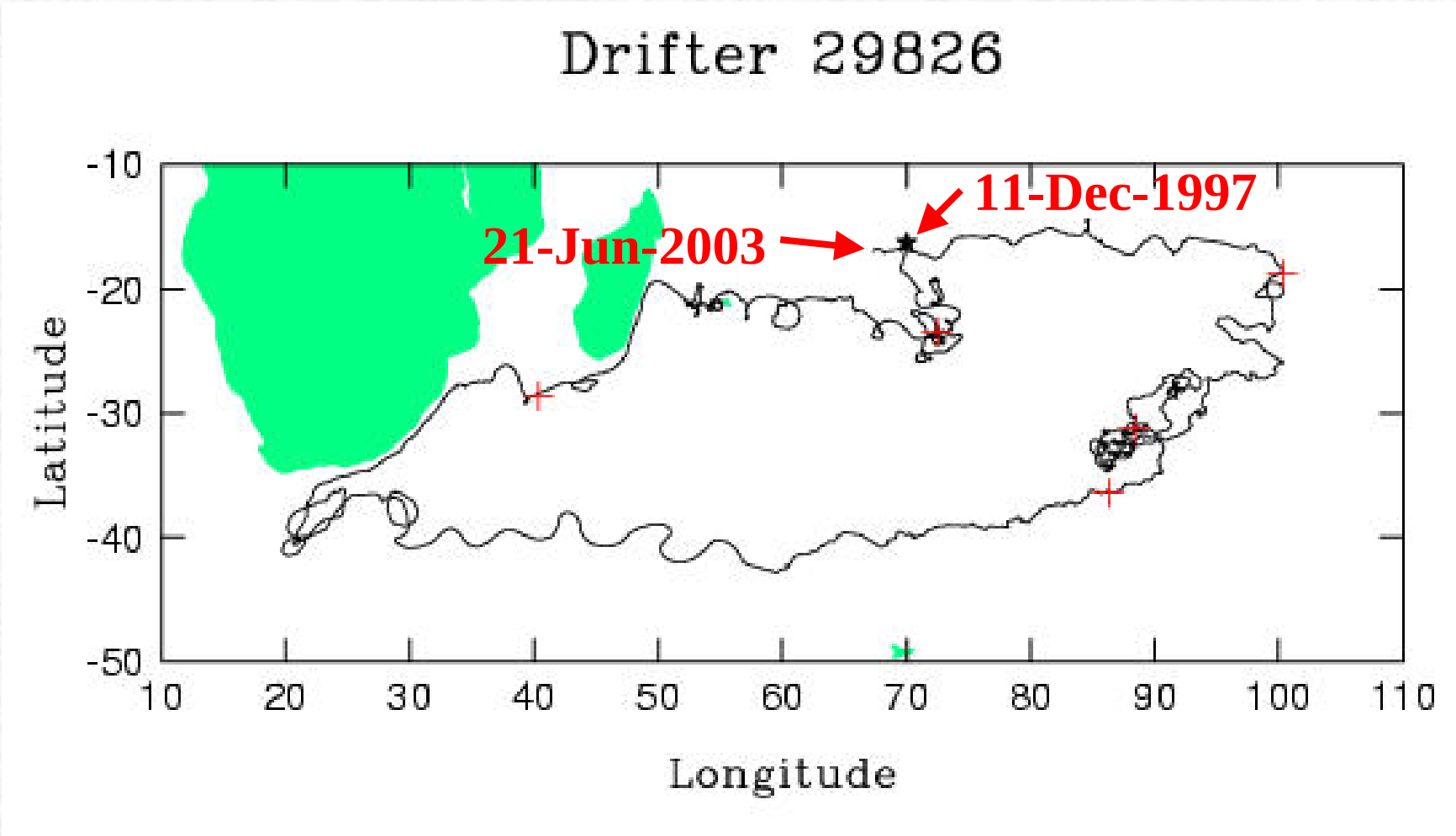
SST good to the end, Death cause: Quit transmitting



Second Longest drogue:2,017 days = 5 years, 6 months

 # days buoy lived: 2,017 days = 5 years, 6 months

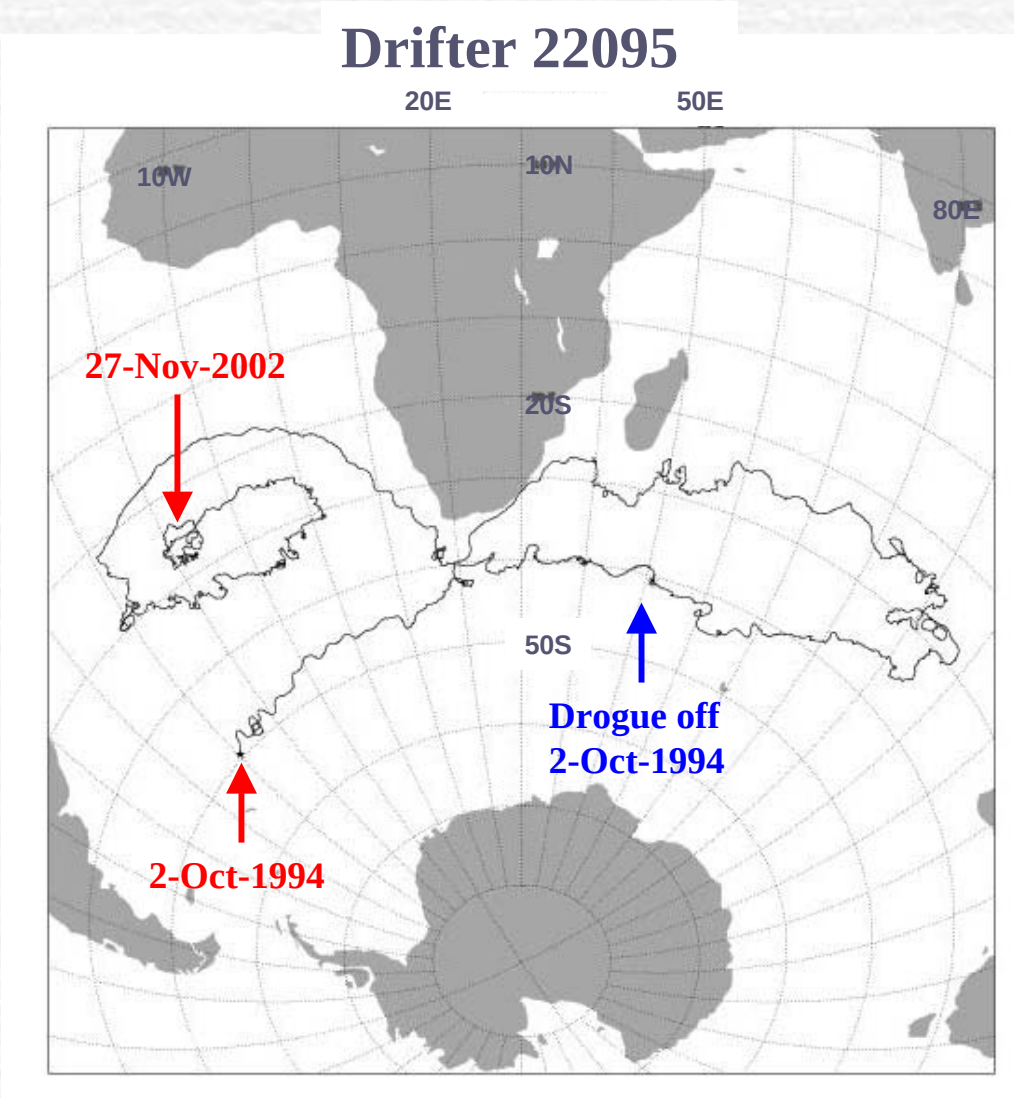
SST good to the end, Death cause: Quit transmitting



Interesting Track :2,978 days = 8 years, 1 month

 # days drogue on: 528 days = 1 year, 5 months

SST good to the end, Death cause: Quit transmitting

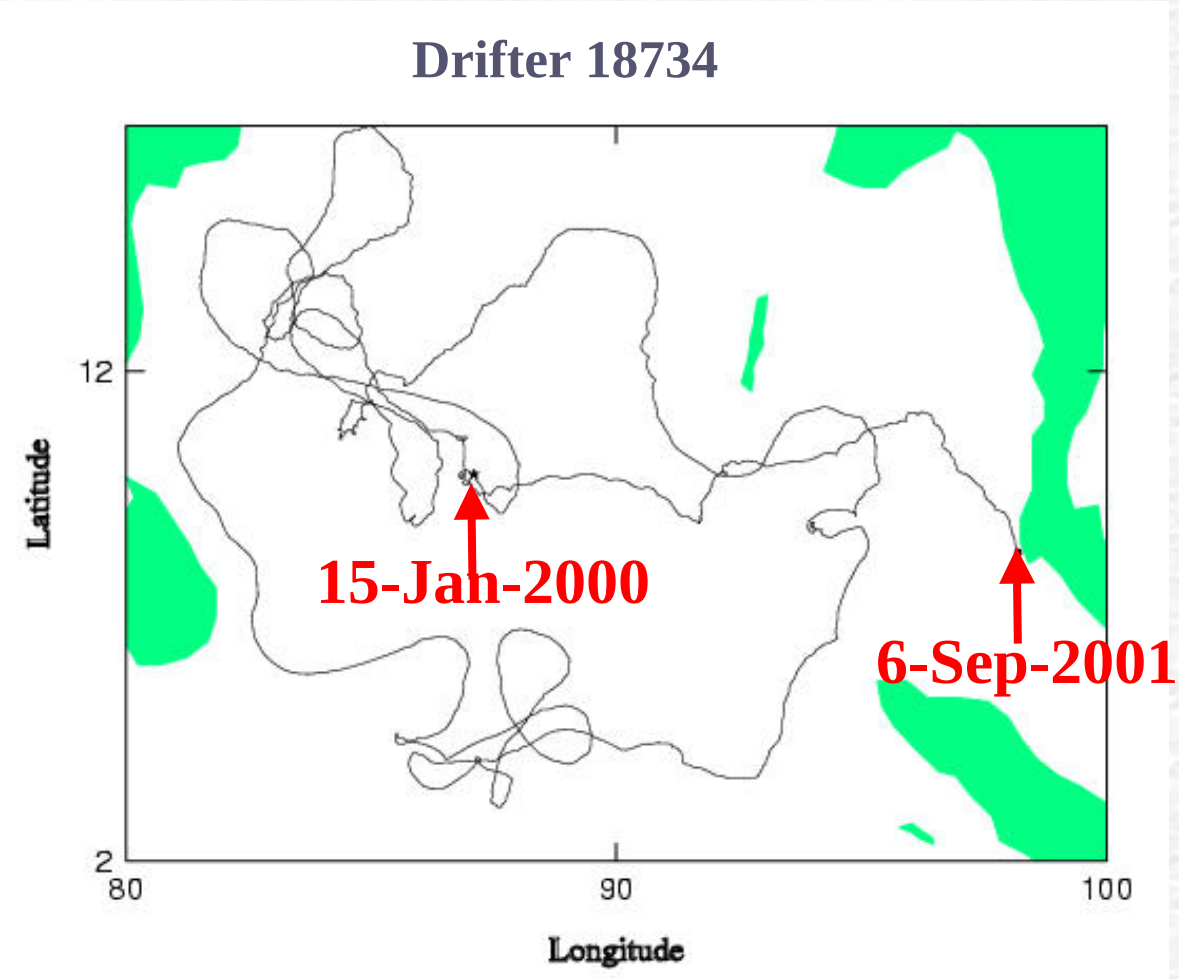


Interesting track : 600 days = 1 year, 7 months,25 days

 # days drogue on: 600 days = 1 year, 7 months,25 days

 # days SST on: 128 days = 4 months

Death cause: Ran aground



MOST INTERESTING TRACK !!!

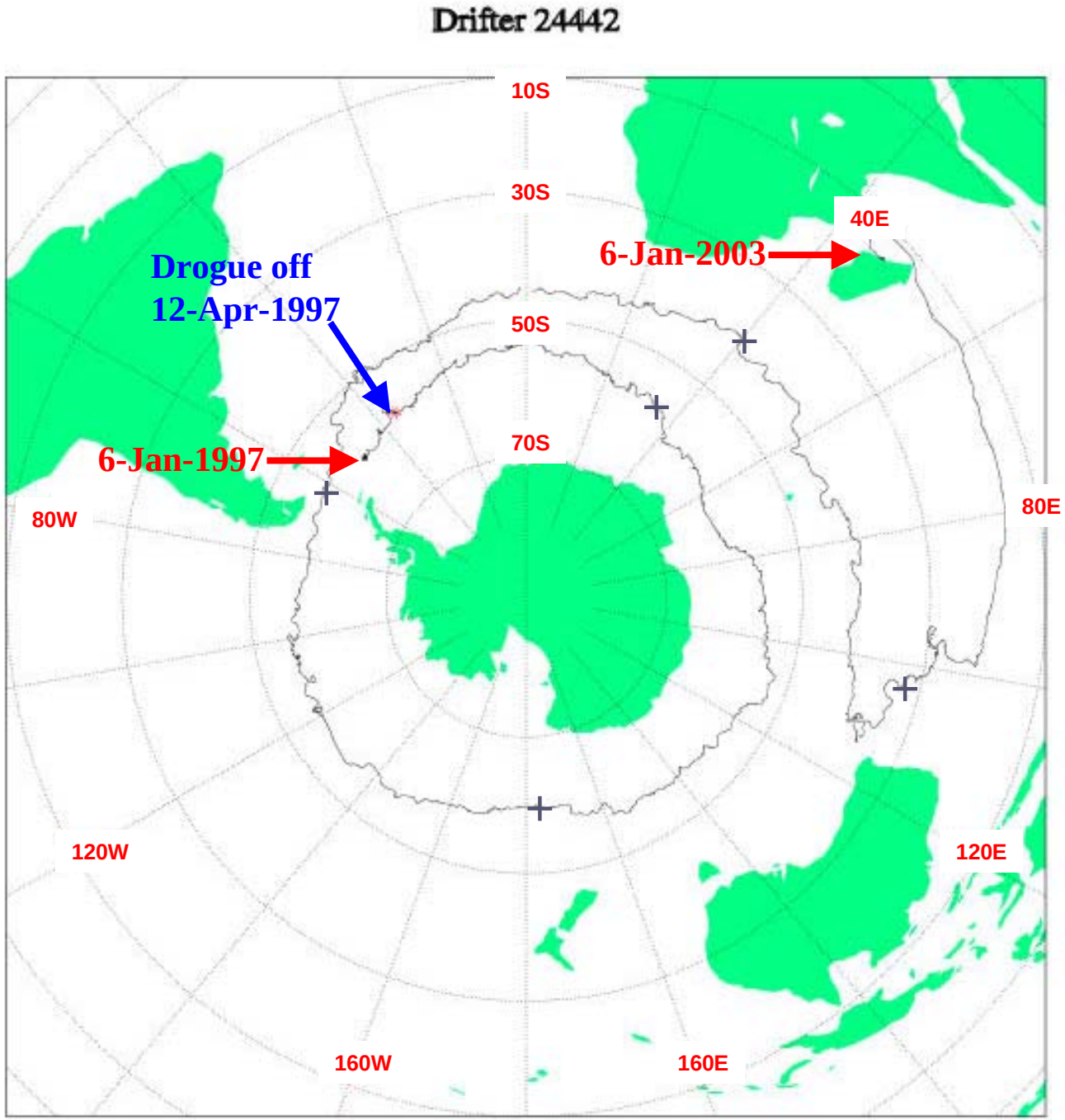
 # days buoy lived: 2215 days = 6 years, 24 days

 # days drogue on: 97 days = 3 months, 7 days

 # days SST on: 2215 days = 6 years, 24 days

Death cause: Ran aground

+ One year marks



Summary

- A total of 4076 buoys were deployed from 1998 to 2003, that is an average of 680 drifters per year by all national and international participants
- The global array has been steady throughout the years with an increase in 1999 due to extra funding received for the Year of the Ocean (YOTO) program
- We would like to see the drifter array increase to reach a goal of 1250 (**??** Subject to JTA negotiations)
- Great improvement in failure rate on deployments. A decrease from 12% and 10% in 1998 and 1999 to only 5% in 2000-2002 and down to 3% in 2003
- Overall improvement in transmitter, drogue and SST sensor's life, exceeding 400 days life expectancy