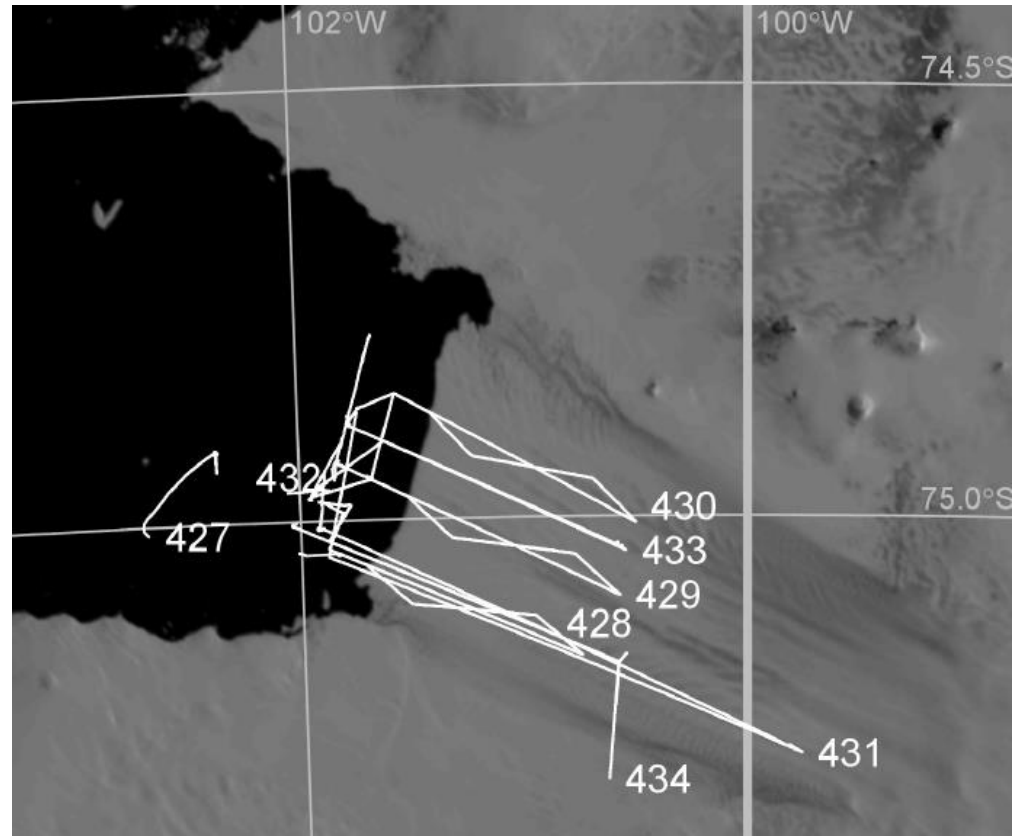


MAS Risk and Reliability and Adaptive Ocean Sampling Networks SBRI Programme.

Dr Mario P. Brito, NOC



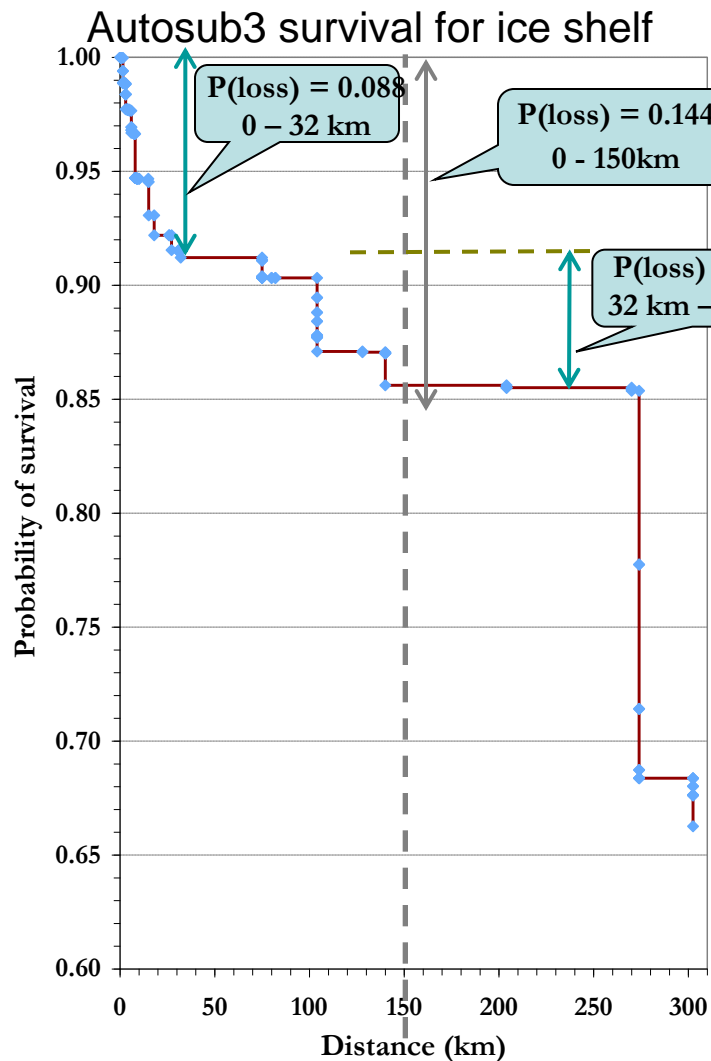
The main goal of the campaign was to gather data that would help determine how the warm Circumpolar Deep Water (CDW) gets beneath the glacier and how it determines the rate at which the glacier melts.



The tracks of all of the 8 Autosub3 missions carried out in the vicinity of the PIG in January 2009, superimposed on a recent MODIS satellite image.

From McPhail et al. 2009.

Autosub3 survival with distance: Non parametric methods



Statistical survival methods are divided in two main groups, non-parametric and parametric methods.

$$\hat{S}(r) = \prod_{r_i < r} \left(1 - \frac{1}{n_i} \right) P(\text{loss}_i)$$

Risk factor n_i	Fault	Dist. (km)	$P(\text{loss}_i)$	Prob. Surv.	Cumulative $\hat{S}(r)$
73	413	0.2	0	1	1
72	388_1	0.5	0.534	0.993	0.993
71	388_2	0.5	0.538	0.992	0.985
70	384_1	1.5	0.839	0.988	0.973
69	384_2	1.5	0.713	0.990	0.963

The effectiveness of using a monitoring distance can be quantified using the conditional probability function (Griffiths et. al, 2003).

$$P(X < x \mid X > y) = \frac{F(x) - F(y)}{1 - F(y)}$$

$F(\cdot)$: Cumulative probability of failure

Looking to collaborate

- European Commission Horizon 2020 BG6 project “Bringing Together Research and Industry for the Development of Glider Services”. A total value of 8M Euro. NOC 1.7M Euro, 106 PM
- Innovate UK KTP Risk and Reliability Management for Unmanned Surface Vehicles. 155K pounds.
- National Capability R&D in Risk and Reliability to support the deployment of a Heterogeneous fleet of MAS



Adaptive autonomous Ocean Sampling Networks (AAOSN)

- NERC, Innovate UK, DSTL. 1.45 M pounds call
- Target is to track dynamic ocean features semi-automatically with mixed fleets of vehicles
- Scenarios of interest are: Cetacean tracking, Follow a tidal-mixing front, Identify source of a single point leak, such as a surface oil spill, Seabed swath mapping

