GO-SHIP I6S: 1 May to 12 May 2019

Dear Colleagues and Friends,

We are steaming back to Cape Town after finishing Sta. 55 at 30°E, 38.5°S near 23:00 local on May 11, 2019. Saying that this is the third *weekly work* report during the I6S cruise is, of course, quite wrong. We are ending the sixth calendar week since departing Cape Town at 16:00 local on April 3, 2019. Less conspicuous, perhaps, is that we have accomplished a little more than two *work weeks*!

Accounting for the time spent on transit between and at stations, the total of *work time* was **14.8 days**, only **36.3%** of the 40.7-day cruise. That is not bad at all! Our expert and relentless teams of hard-working scientists defied punishing weather, mechanical and medical failures to accomplish, on average four deep CTD stations per *work day*.

How did this happen?
At the writing of the second *weekly work* report, and for 51.6 hours between April 30 and May 2, CTD work was delayed by a large storm. We managed to occupy Stas. 44 and 45 before the next mega storm got in our way, this time we valiantly battled it for 42.7 hours during May 2-4. Combining these last two bad weather-related delays to those suffered in April 24 (9.8 hours), April 25-28 (71.6 hours), plus 7 hours here and there, it adds up to **7.6 days** or **18.7%** of the cruise duration.

Unfavorable seas, sea-ice and weather are all well-known and unavoidable conditions that make working in the Southern Ocean so uniquely unpredictable. The sole remoteness of the I6S line required long steaming times: 7.5 days to the first station, and 2.4 days from the last station to Cape Town. That is, **24.3%** of the cruise time was spent on steaming back and for to do CTD work.

Engine problems resulted in the loss of **5.1 days**, but they happened at the very beginning of our cruise, and it was partially ameliorated with two additional days.

The most unfortunate event in our cruise was the medical evacuation of a graduate student, that started while we were coping a storm on April 3 near 30°E, 50°S. The rapid transit to Port Elizabeth (yet **10.7%** of the cruise duration) resulted in the successful evacuation and provision of appropriate health care to the student in land. Nonetheless, the **4.3-day** transit back to the planned location of Sta. 46 could not be accomplished in the amount of time left.

About 130 nm northeast of Port Elizabeth we occupied a *relocated* Sta. 46 at water depth of about 550 m. Stations 47 to 51 (30°E, 35°S) were located farther to the southeast with progressively larger spacing in between (10 to 35 nm). The last four stations were intended to be 1° latitude reoccupations along 30°E, but interference from a chines fishing vessel resulted in the slight relocation of Sta. 54. Strict implementation of the 23:00 May 11 deadline to our brief and final 69 hours of *work time* placed Sta. 55 at 30°E, 38.5°S.

What ifs?

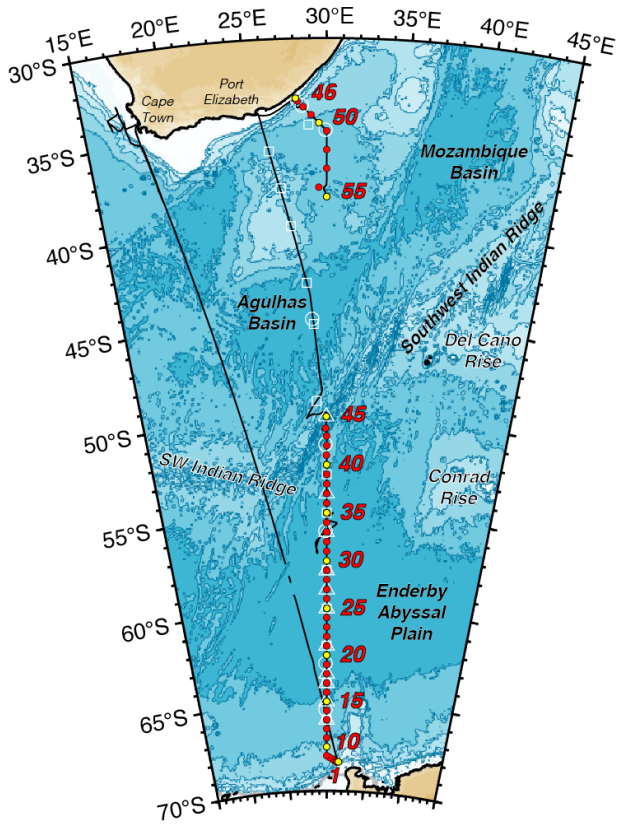
It's understandable that sometimes we contemplate alternative scenarios to less than desirable story endings. Consider, for instance, how efficient our science teams performed throughout the *working time* on this cruise. At the established working pace and 30-nm spacing a happy ending would have needed:

a) 6.3 more *work days* to fill in the 11.5° gap now left unsampled along 30°E; or
b) only 1.3 days of bad weather out of 41 days in the Southern Ocean; or
c) a more reasonable 3.3 bad weather days and no engine failures; or,
d) even with all the experienced bad weather but sparing preventable mechanical and health failures.

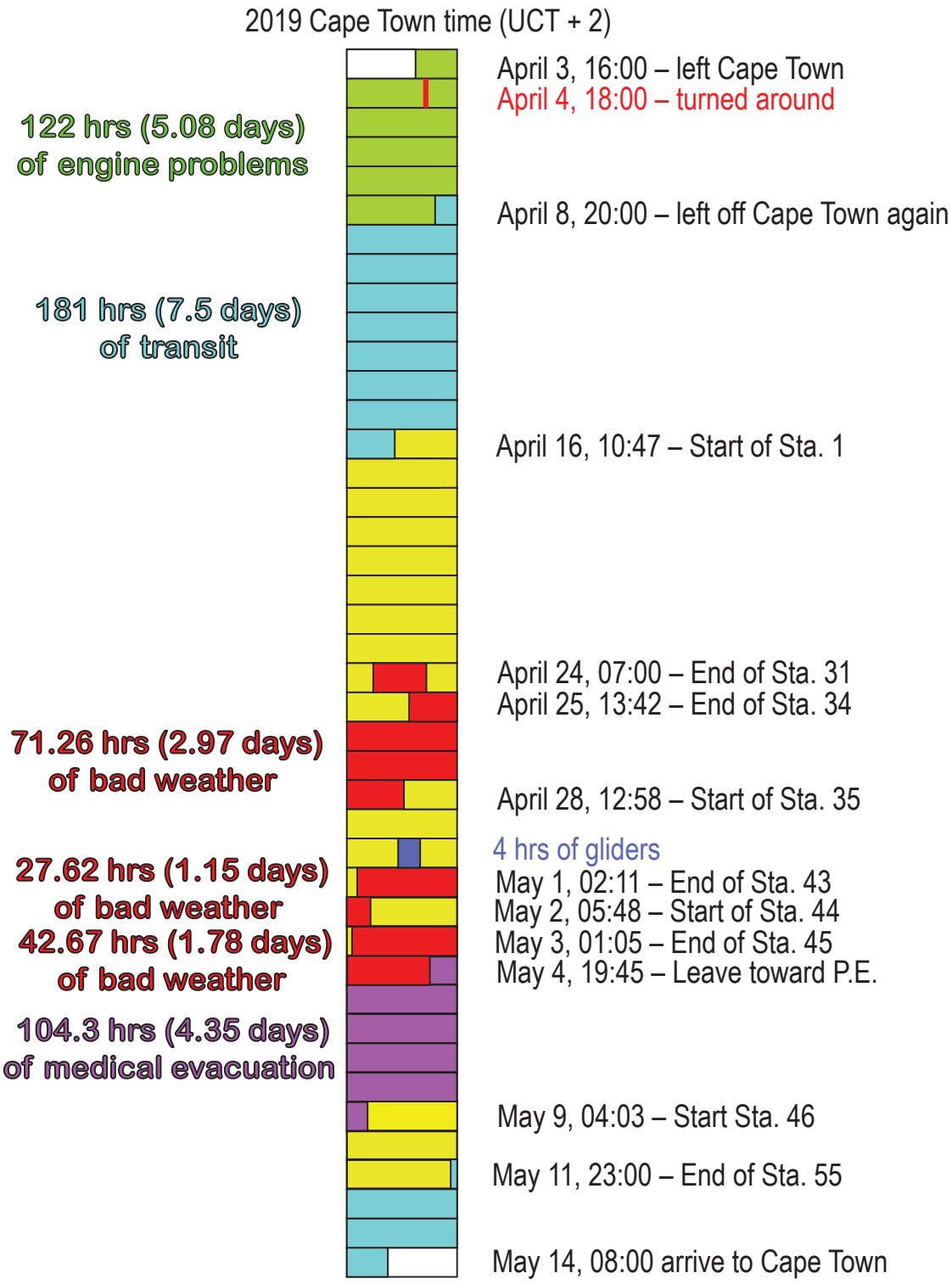
It is hoped that, in addition to acquiring new hydrographic measurements with the highest quality standards, our I6S 2019 experience will also better prepare the next generations for the many challenges of working in the Southern Ocean.

It has been a privilege and a pleasure to share these stories with you all.

Best regards,
Alex Orsi
Chief Scientist
I06S-2019



Cruise track and CTD station locations (red dots) during GO-SHIP I6S 2019. White triangles, circles and squares indicate deployment locations of ARGO and SOCCOM floats and surface drifters.



GO-SHIP I6S cruise timeline.