



The borehole observatories for the Japan Trench are just a pair of very long string of sensors.

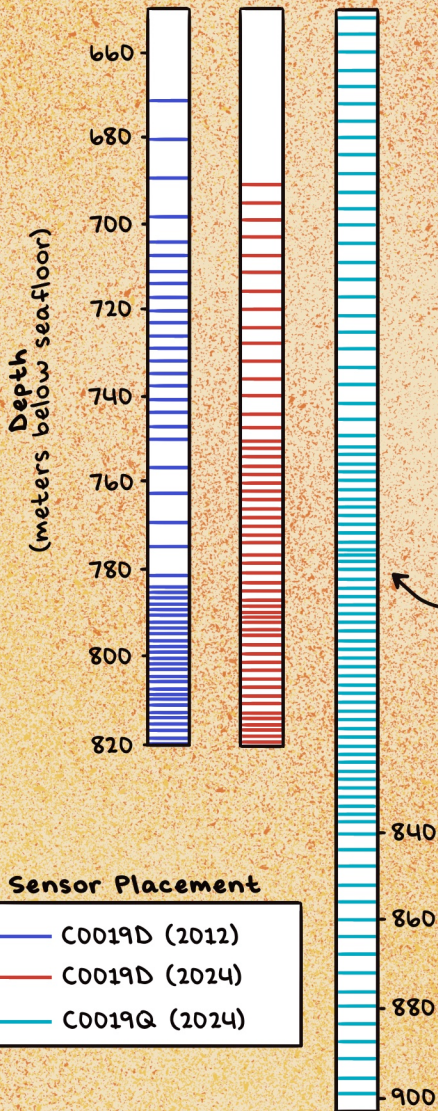
(Literally a huge drum of special strong rope with 128 temperature sensors attached to it from last year's JTRACK expedition)



We have 57 sensors in the borehole observatory for Hole C0019D (drilled in 2012).

And 128 sensors for Hole C0019Q (from 2024).

(The last sensor going downhole during last year's expedition)



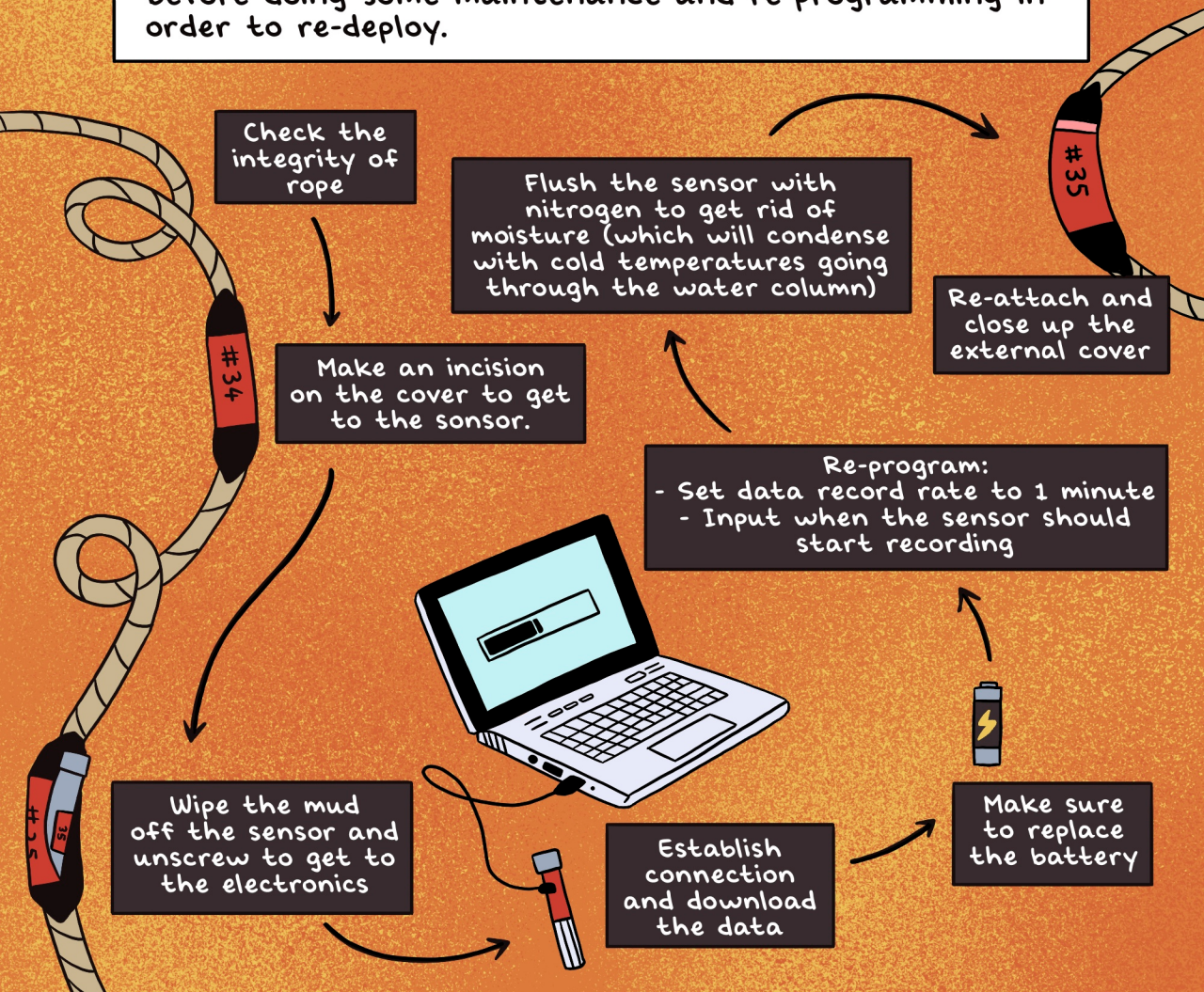
The placement of the sensors is planned based on expectation of where the major faults are from other sources of data.

For example, denser sensor placement is chosen where one might suspect high heterogeneity.

Despite this straightforward design, the deployment of these observatories is very labor-intensive! Each sensor is programmed and prepared individually.

-
- ☐ Open (autozero)
 - ☐ Connect
 - ☐ Step recording
 - ☐ Download data
 - ☐ Export to PC (CSV) app
 - ☐ Using list of trends size
 - ☐ Disconnect
 - ☐ Battery change
 - ☐ Reconnect
 - ☐ Time sync (UTC)
 - ☐ Change sampling interval
 - ☐ Set start time: 10/23/2012 10:00 AM
 - ☐ Enable logging
 - ☐ Screenshoot
 - ☐ Disconnect
 - ☐ Grease o-ring
 - ☐ Nitrogen gas
 - ☐ Close instrument
- Put blue tape to indicate it's been reprogrammed

For Expedition 502E, we also had to retrieve the two sensor strings, download the data from 185 sensors to get the recorded temperatures since Expedition 405 before doing some maintenance and re-programming in order to re-deploy.



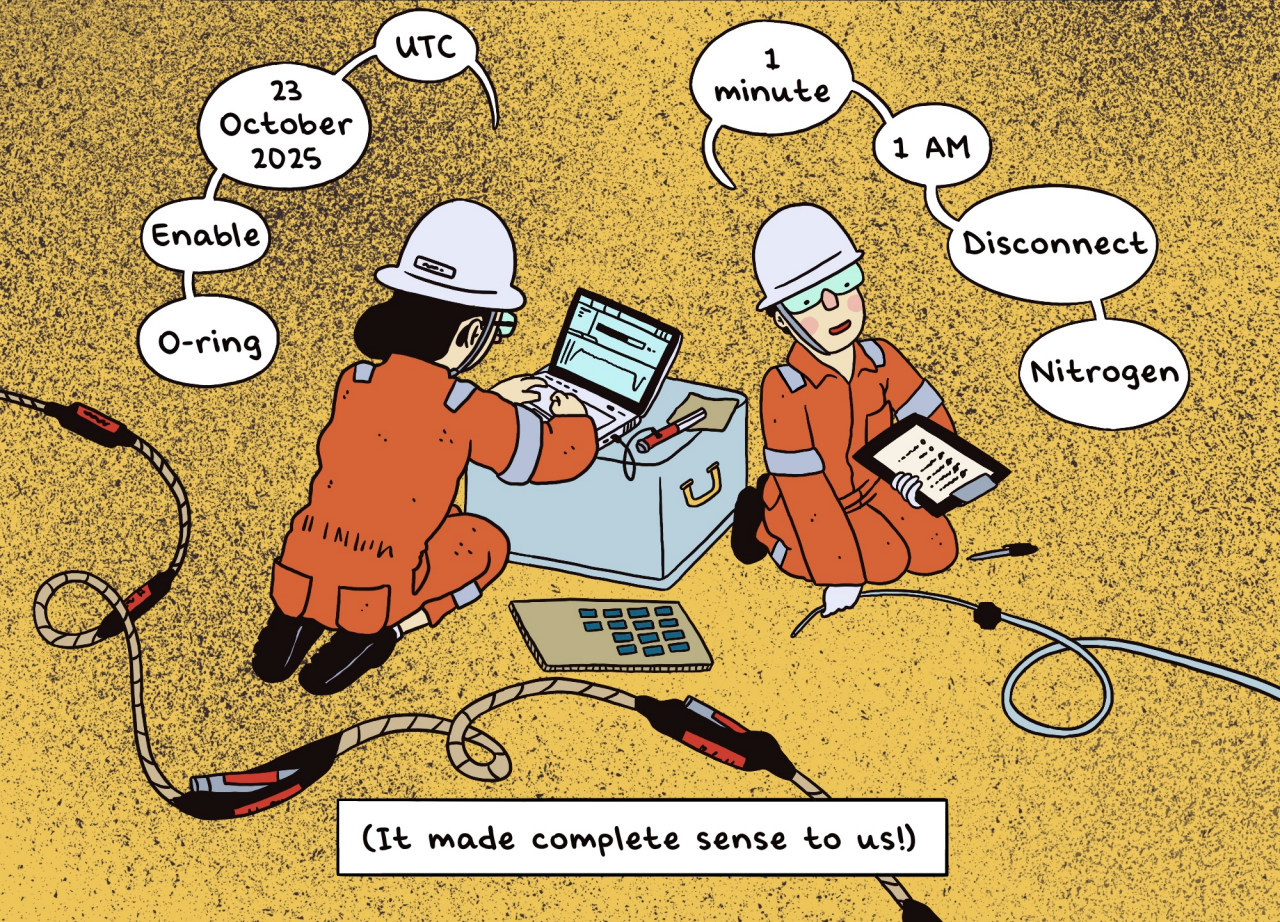
We did all of that in about ~24 hours.
(It was a very long day.)

We are super grateful for all the help from folks from
JAMSTEC/MarE3, Marine Works Japan, Mantle Quest Japan.

ありがとうございます

We had four teams of four people: an opener, a programmer, a helper, and a closer.

The conversation between the programmer and the helper after a couple of dozen sensors would have been absolutely nonsensical to an outside observer.

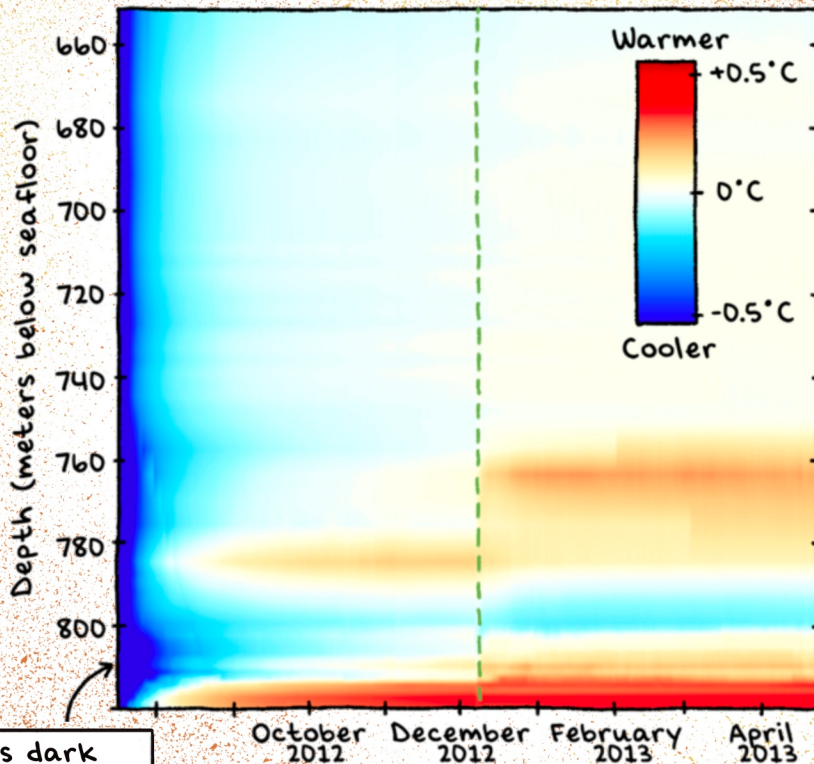


(It made complete sense to us!)

All the sensors are retrieved, downloaded, maintained, re-programmed, and re-installed as of afternoon of October 23, 2025.



These sensors will stay in holes C0019D and C0019Q for the next 5-10 years, taking a temperature recording every minute... potentially teaching us about transient behavior of fault zones.



This dark blue shows the effect of drilling.

The green line represents a local earthquake that shows changes in the temperature signal, giving us clues about permeability of the fault.

We are looking forward to the analysis of the data
we just downloaded from the sensors.

(And we keep our fingers crossed for more
good data in years to come.)

いってきます