

RBR

Welcome, the RBR Webinar will begin shortly...



Future Webinars



Wave processes on coral reefs and the impact of sea level rise on atoll islands

Eddie Beetham (Tonkin + Taylor)

September 10, 2020 at 11AM AEST (GMT+10)

RBR



Conductivity Measurements in Highly Turbid Environments

Daniel Nelson
Technical Sales Manager
North America, West



Loggers



OEM

Sensors



Systems



RBR



RBR

Sensor	Accuracy
Conductivity	± 0.003 mS/cm
Temperature	$\pm 0.002^{\circ}\text{C}$
Depth	$\pm 0.05\%$ FS



RBRconcerto³ C.T.D

240 million readings, up to 32Hz sampling

Available configurations: RBRconcerto³ C.T.D|fast8, RBRconcerto³ C.T.D|fast16, RBRconcerto³ C.T.D|fast32

750m, 2000m, and 6000m ratings

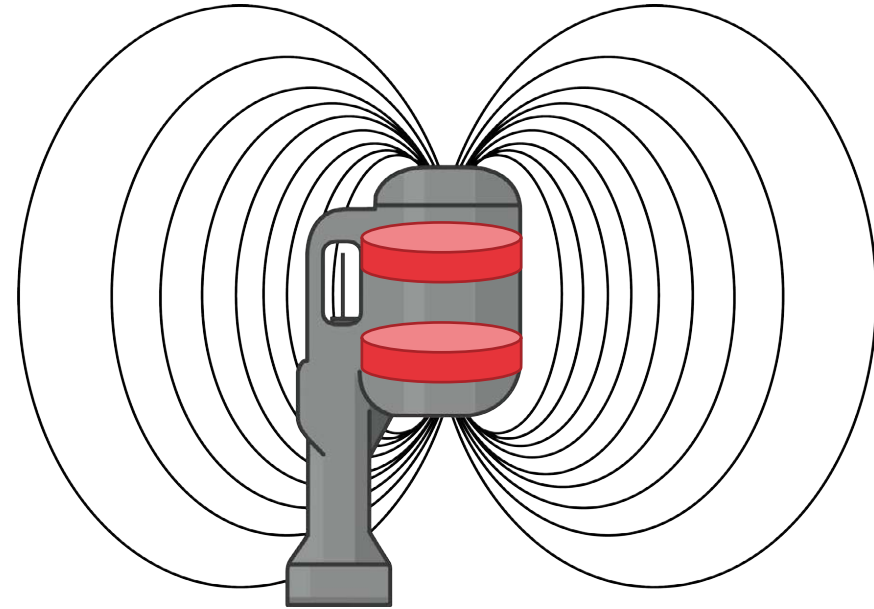
USB-C download

Twist Activation and Wi-Fi

RBR

Measurement principle of an inductive conductivity cell

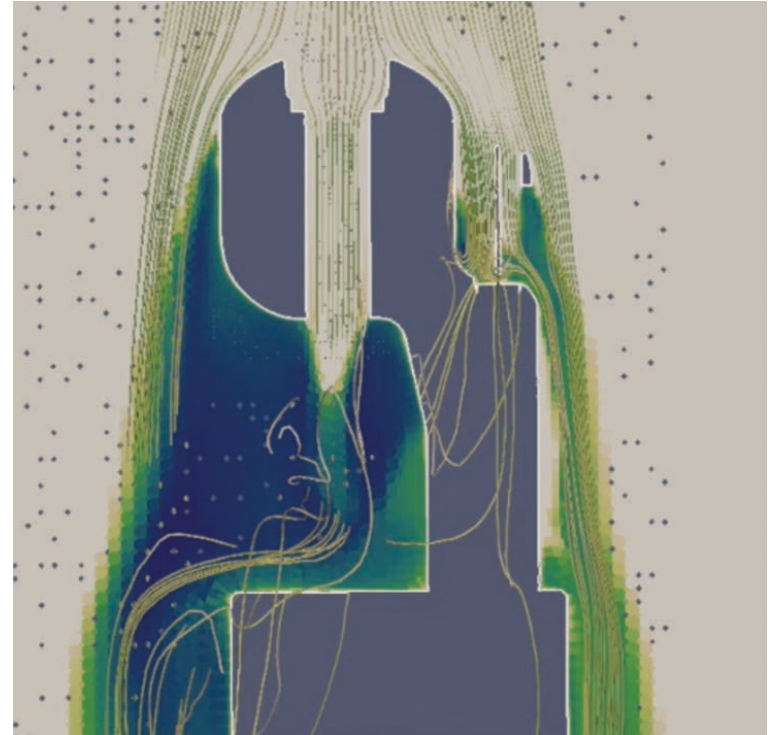
- Drive coil and receive coil
 - Apply an AC current to the drive coil
 - Causes a changing magnetic flux in the generating ferrite
 - Electrical current induced in sea water
 - Changing current in sea water induces magnetic flux in receiving ferrite
 - Changing magnetic flux in ferrite causes AC current in receiving coil
 - Current in receiving coil is **proportional to the seawater conductivity**



A few pros and cons of inductive conductivity cells

Pros:

- Conductivity cell can be built with a low aspect ratio
- Cell flushes naturally
- No pump required
- Low power consumption
- Acoustically quiet
- Robust
- "Contactless"
 - No metal electrodes
 - Not affected by surface oils



Proximity effects

Any material within close proximity of the conductivity cell changes the measured conductivity.

- Recommended to keep objects 15cm from cell
- High bias for conductive material (e.g., stainless steel guard)
- Low bias for non-conductive material (e.g., rope or insulated mooring line)
- Calibration can eliminate proximity effect
 - Instrument calibrated in the guard
 - Float heads calibrated with Iridium antenna and oxygen optode
- Can measure accurate conductivity when cell is 10cm from air-sea interface



RBR

Proximity errors from insulated steel mooring line

75mm clamp



150mm clamp



150mm clamp	<0.0001 PSU error
75mm clamp	0.0025 PSU error
Calibration spec	~0.003 PSU



Thank You

Contact Us

RBR
rbr-global.com
info@rbr-global.com
+1 613 599 8900

RBR



Chronicling seasonality in Beaufort Sea Lagoons

Hydrographic highlights from the Beaufort Lagoon Ecosystems
Long Term Ecological Research program

Christina Bonsell, PhD

University of Texas Marine Science Institute



**BEAUFORT LAGOON
ECOSYSTEMS LTER**



BEAUFORT LAGOON ECOSYSTEMS LTER



12 lab groups
6 universities*
500 miles of coastline

*UT Austin, UT El Paso, UMASS Amhurst, VIMS, UToronto, OSU, UAF

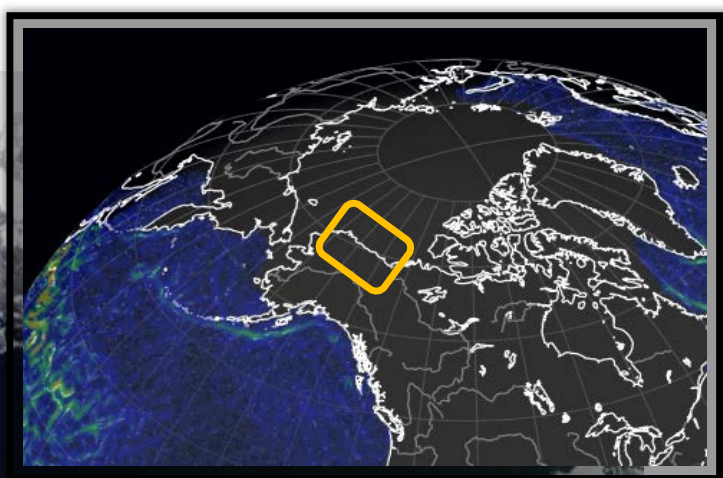


**Utqiagvik
(formerly
Barrow)**

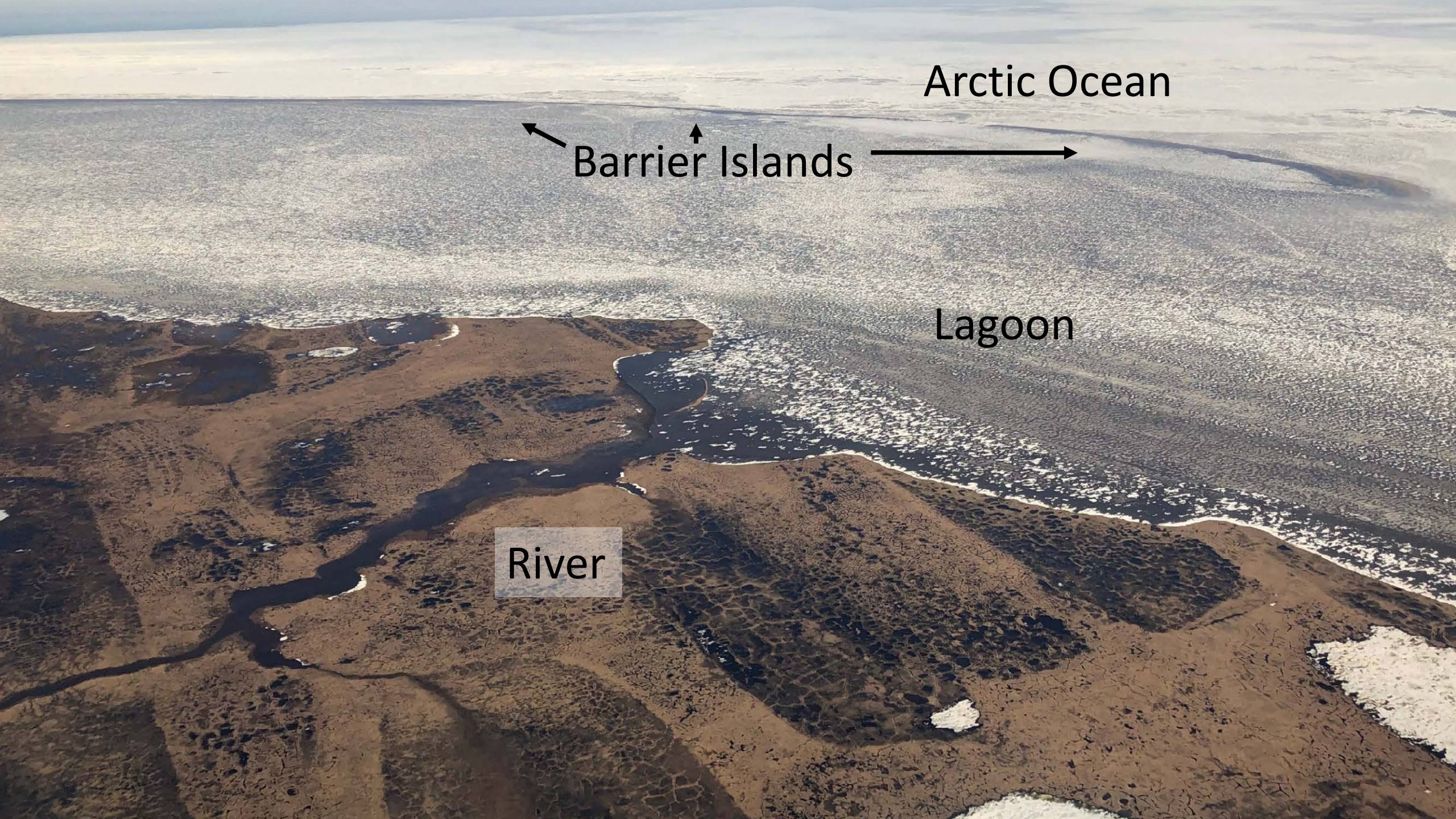
Beaufort Sea

Kaktovik

**Prudhoe
Bay**



How does seasonality connect to ecosystem resilience?



Arctic Ocean

Barrier Islands

Lagoon

River







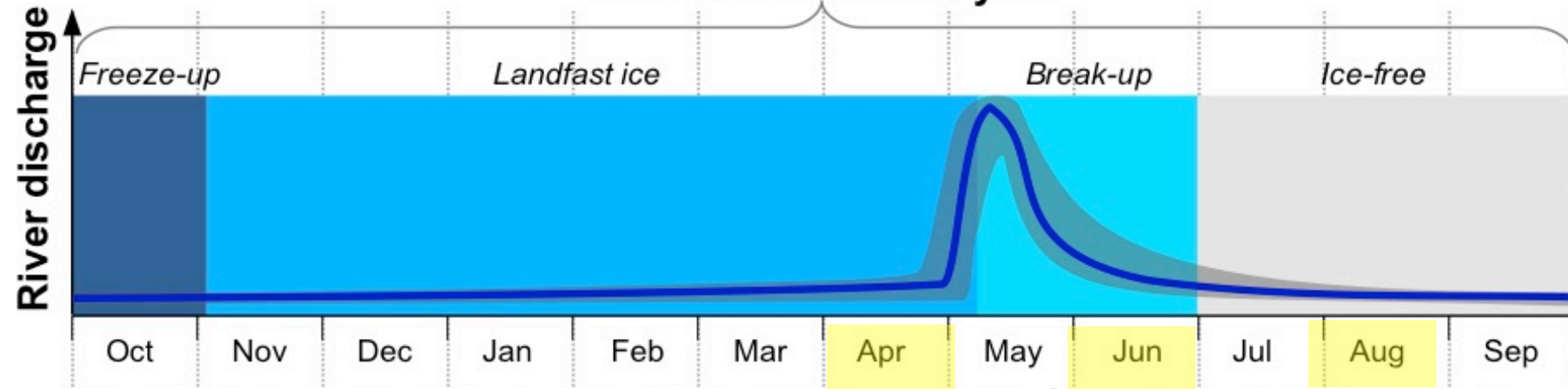




Local concerns

- Human health
- Infrastructure
- Economic opportunities
- Subsistence

Mean landfast ice cycle



Mahoney et al. 2007



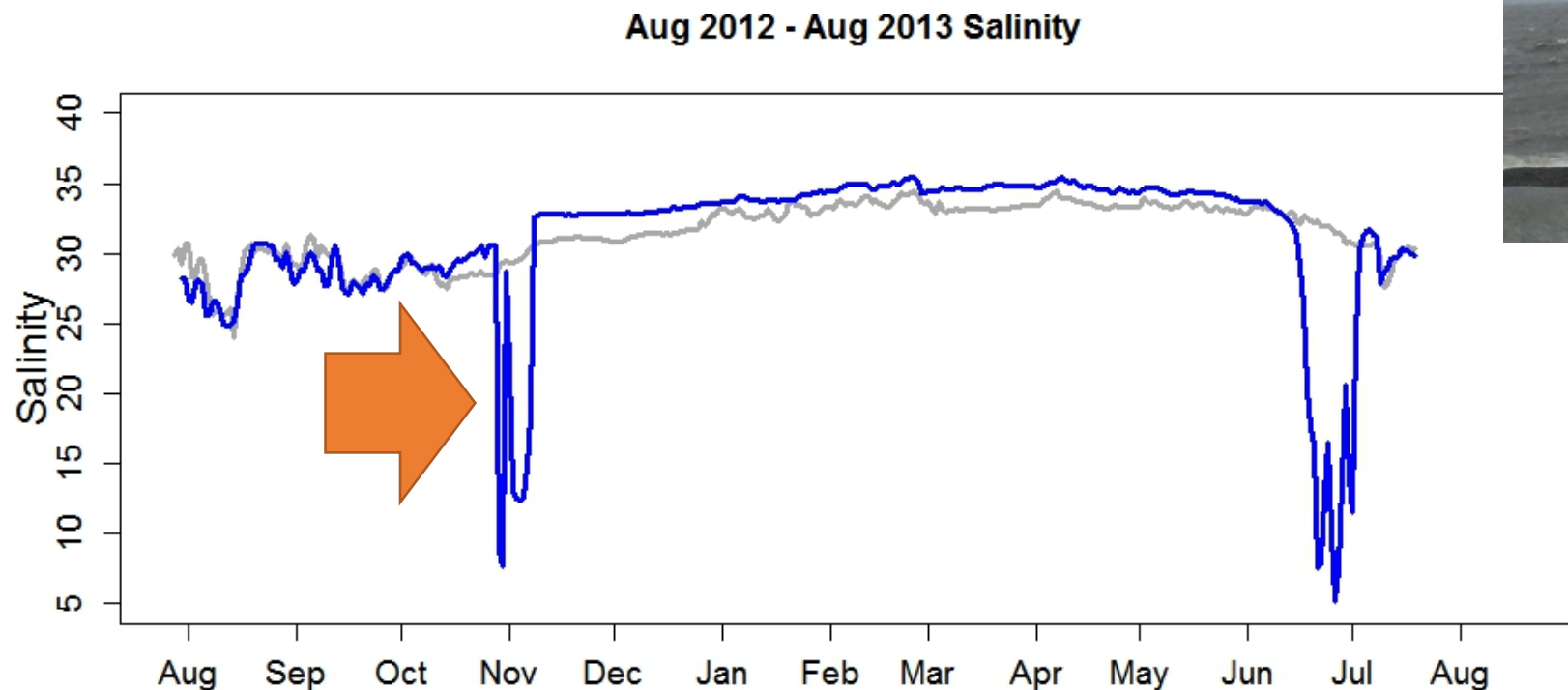
Mooring design: Obstacles

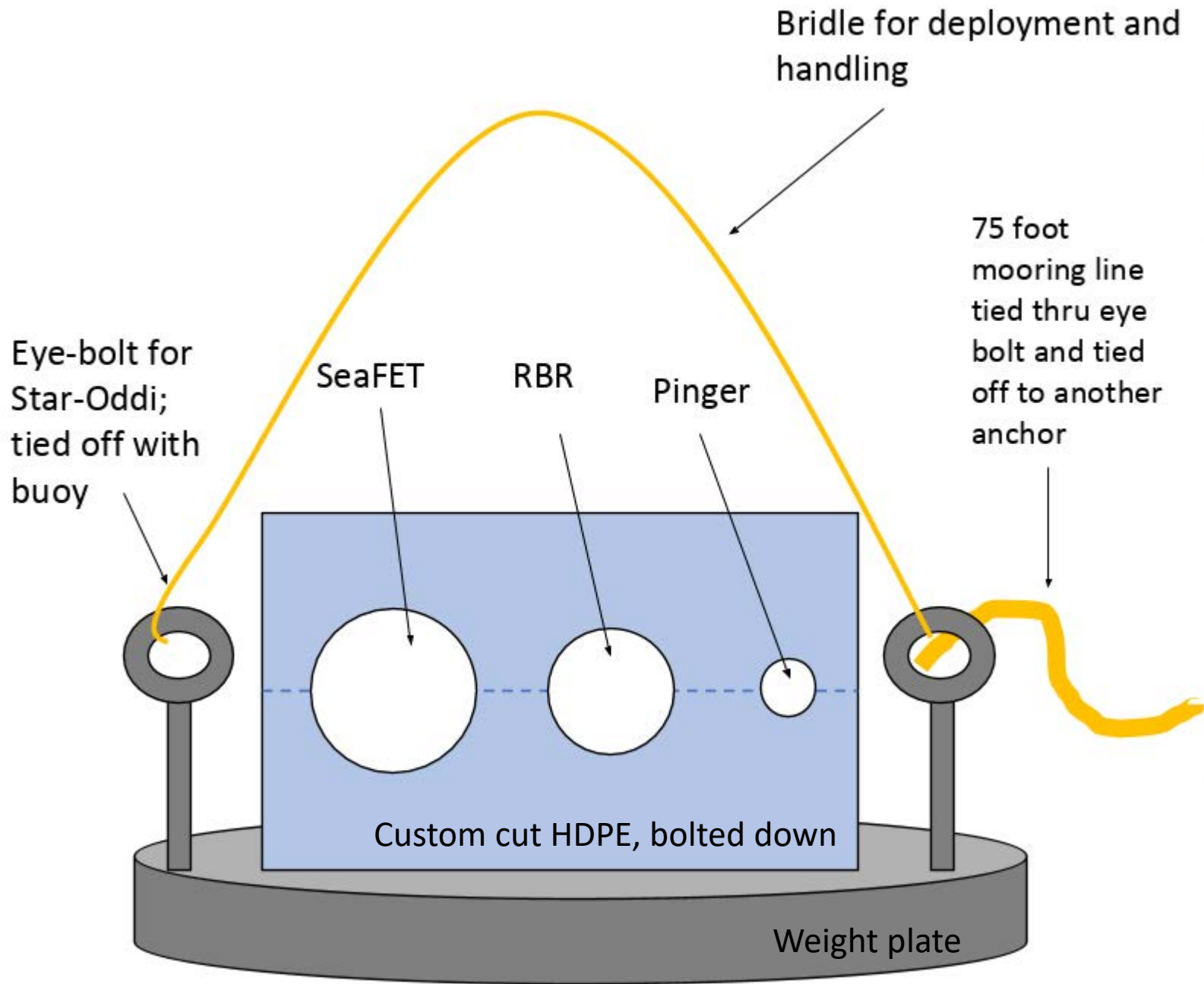
- Sea ice
 - No surface buoy
 - Acoustic release \$\$\$\$
 - Lagoons shallow (<5 m)
 - Scour occasionally destroys instruments



Mooring design: Obstacles

- Suspended sediments

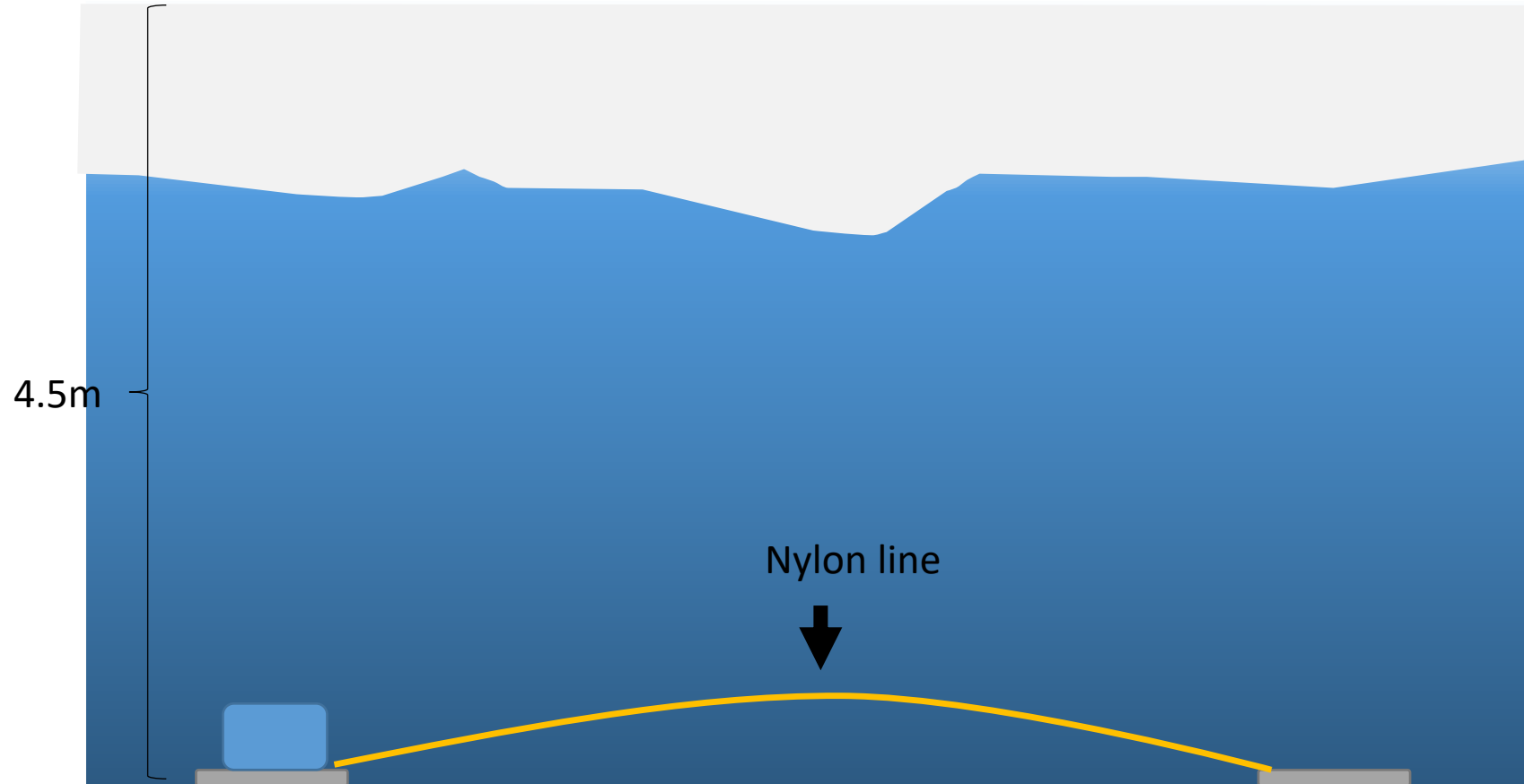




Mooring design

Off the benthos, but not by too much

- Want to understand benthic processes



Mooring design





QA/QC

- Done in R
- Created custom R package “insitu”
 - github.com/BLE-LTER/insitu
 - Collab: An Nguyen, BLE LTER Information Manager
 - Functions to import, look at , calibrate, and flag data
 - Also calculate_salinity if you don't want to also load “oce”

```
devtools::install_github("BLE-LTER/insitu")
```

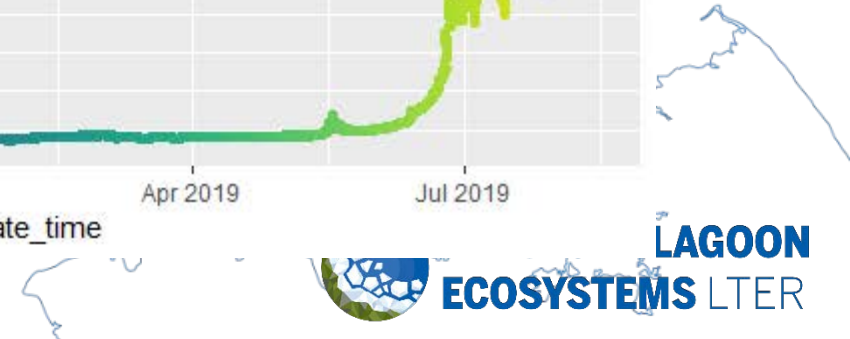
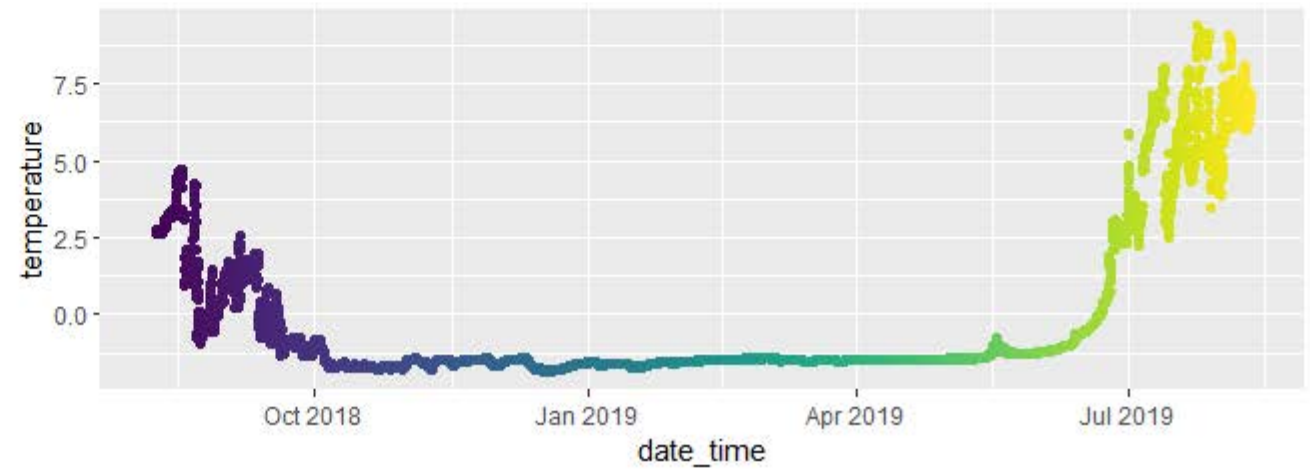
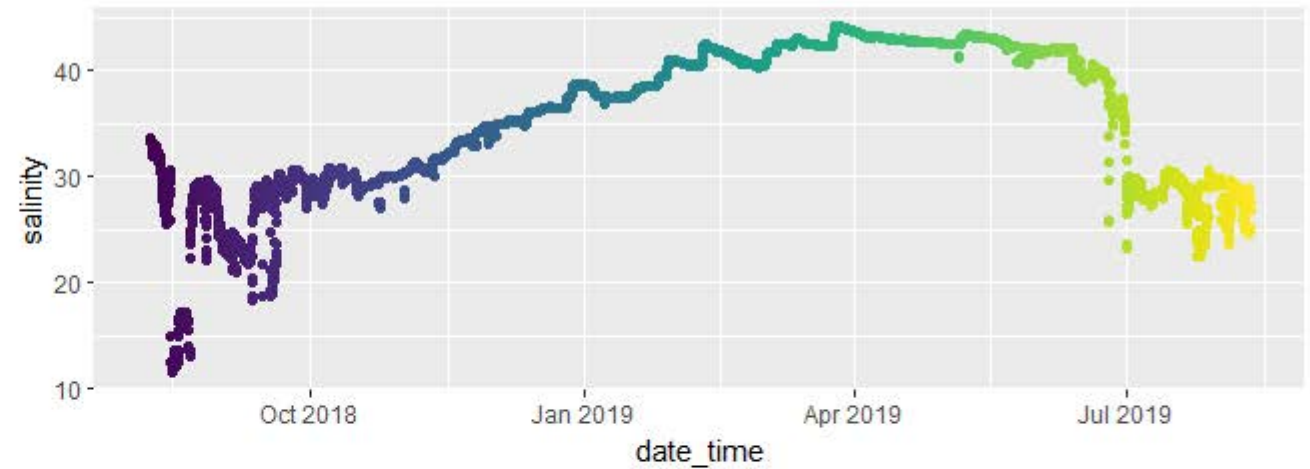
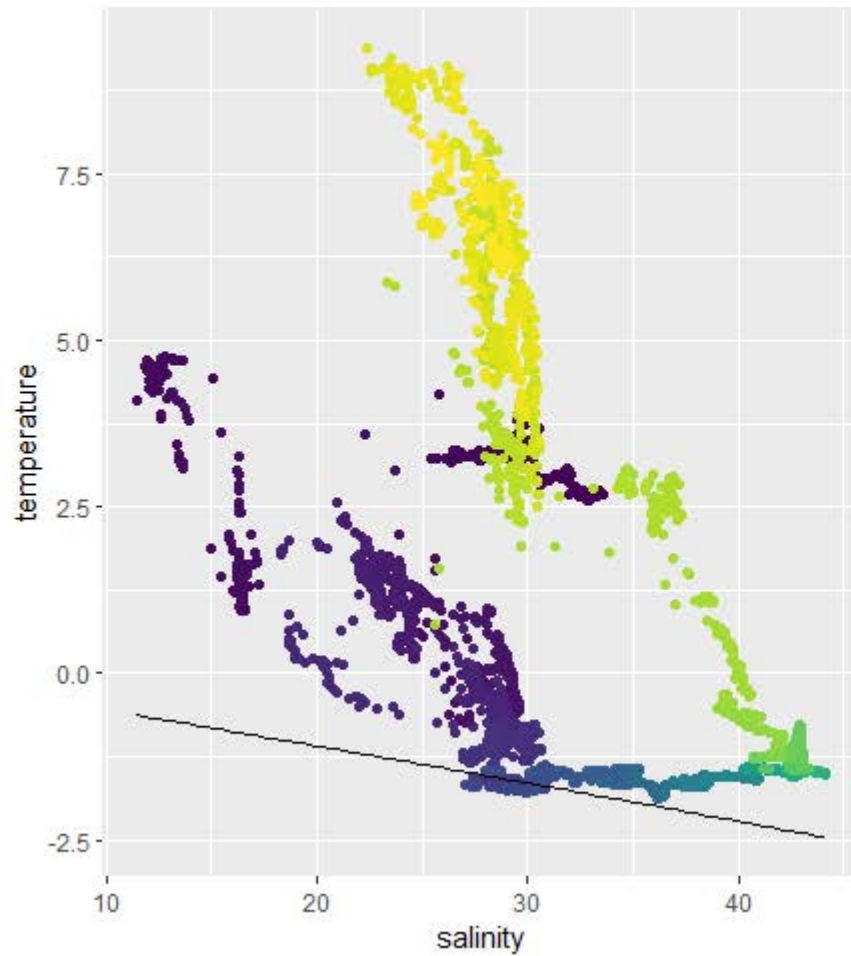




Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community

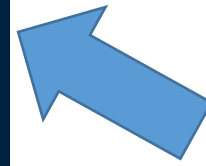
```
plot_tempsal(TS, "temperature", "salinity", "date_time")
```

Temperature vs Salinity

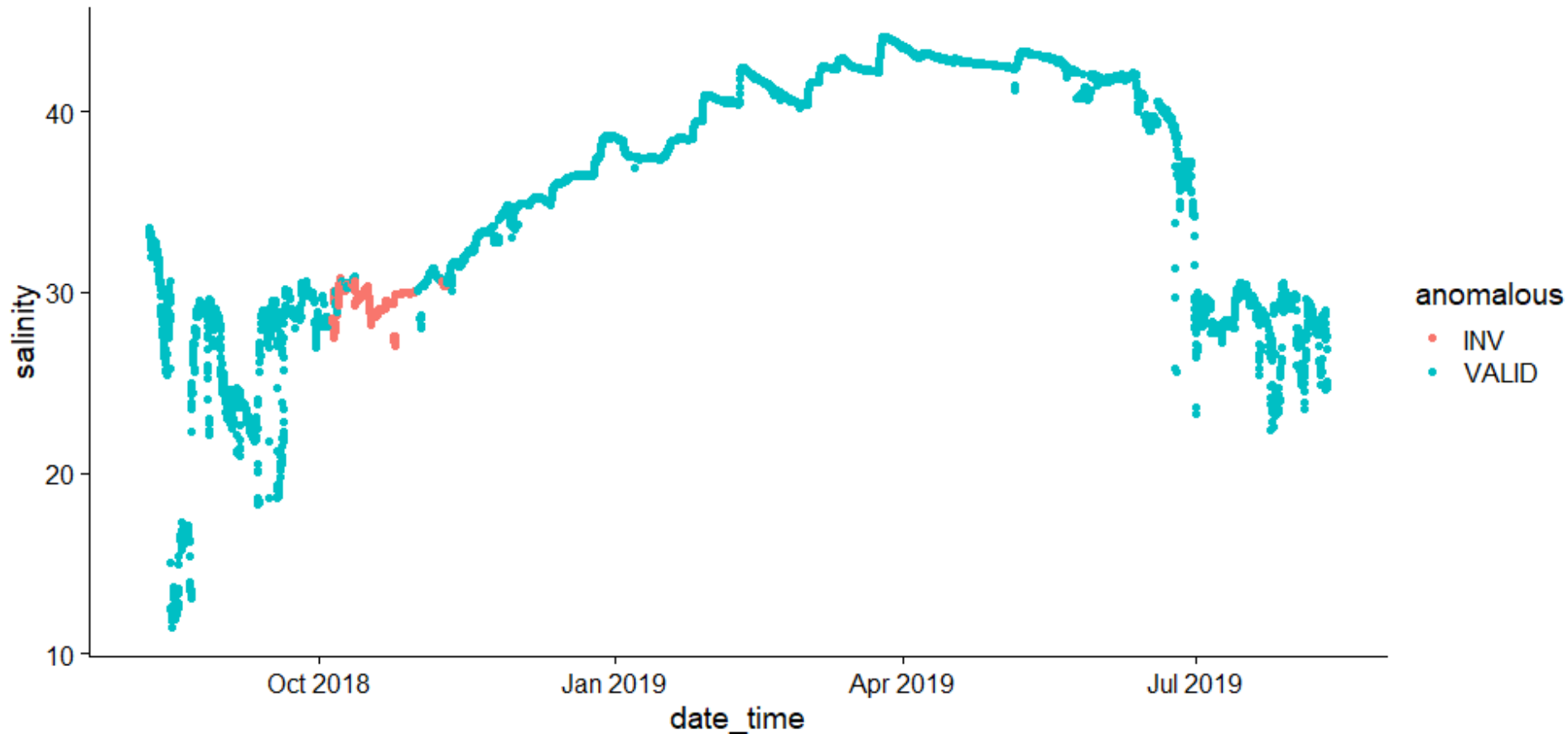


```
TS_flagged <- flag_salinity(TS, TError=0.002, Cerror=0.01,  
                             flag_scheme = c("VALID", "INV"))
```

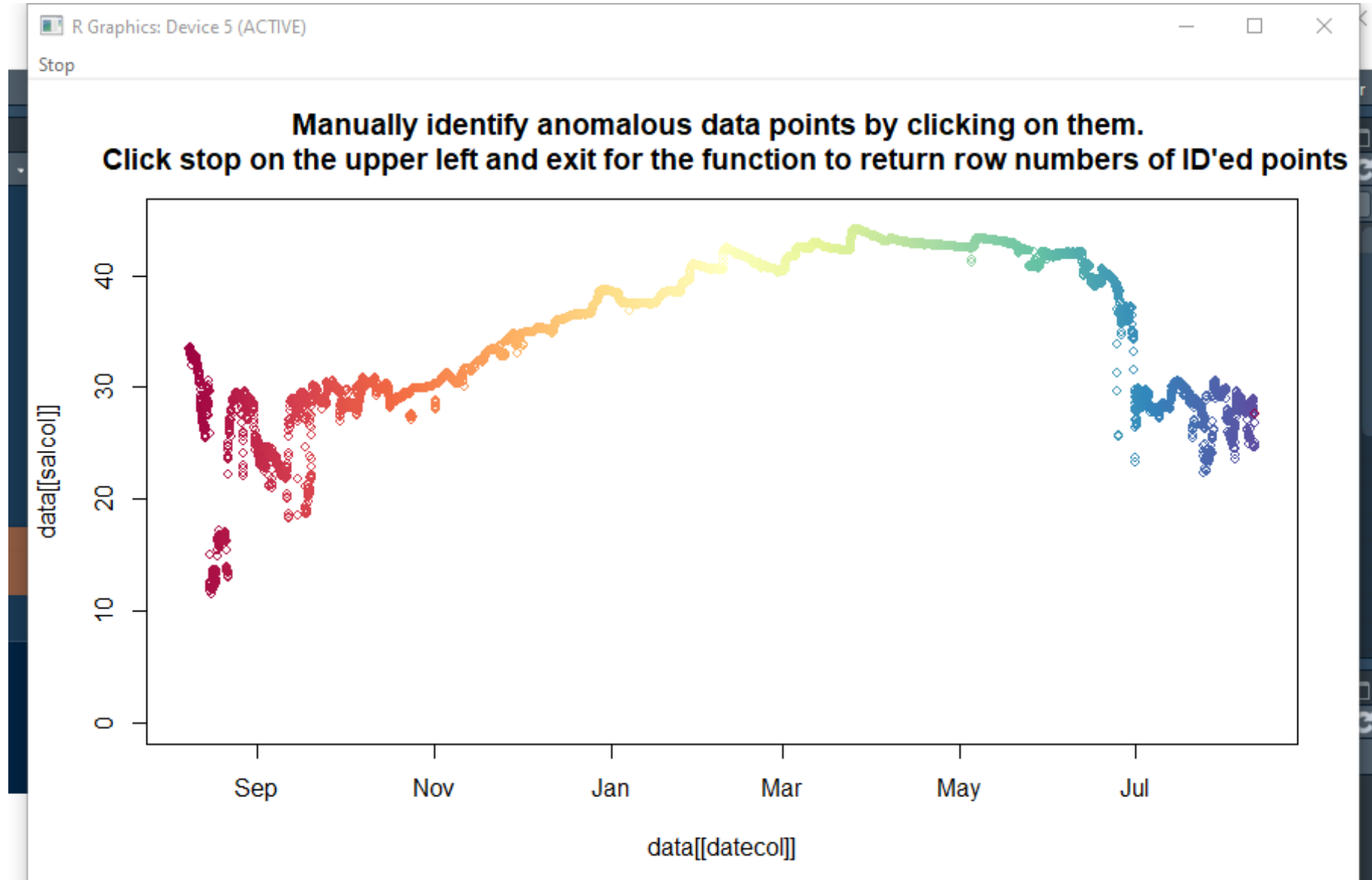
```
ggplot(TS_flagged, aes(date_time, salinity))+  
  geom_point(aes(color=anomalous))+  
  theme_cowplot()
```

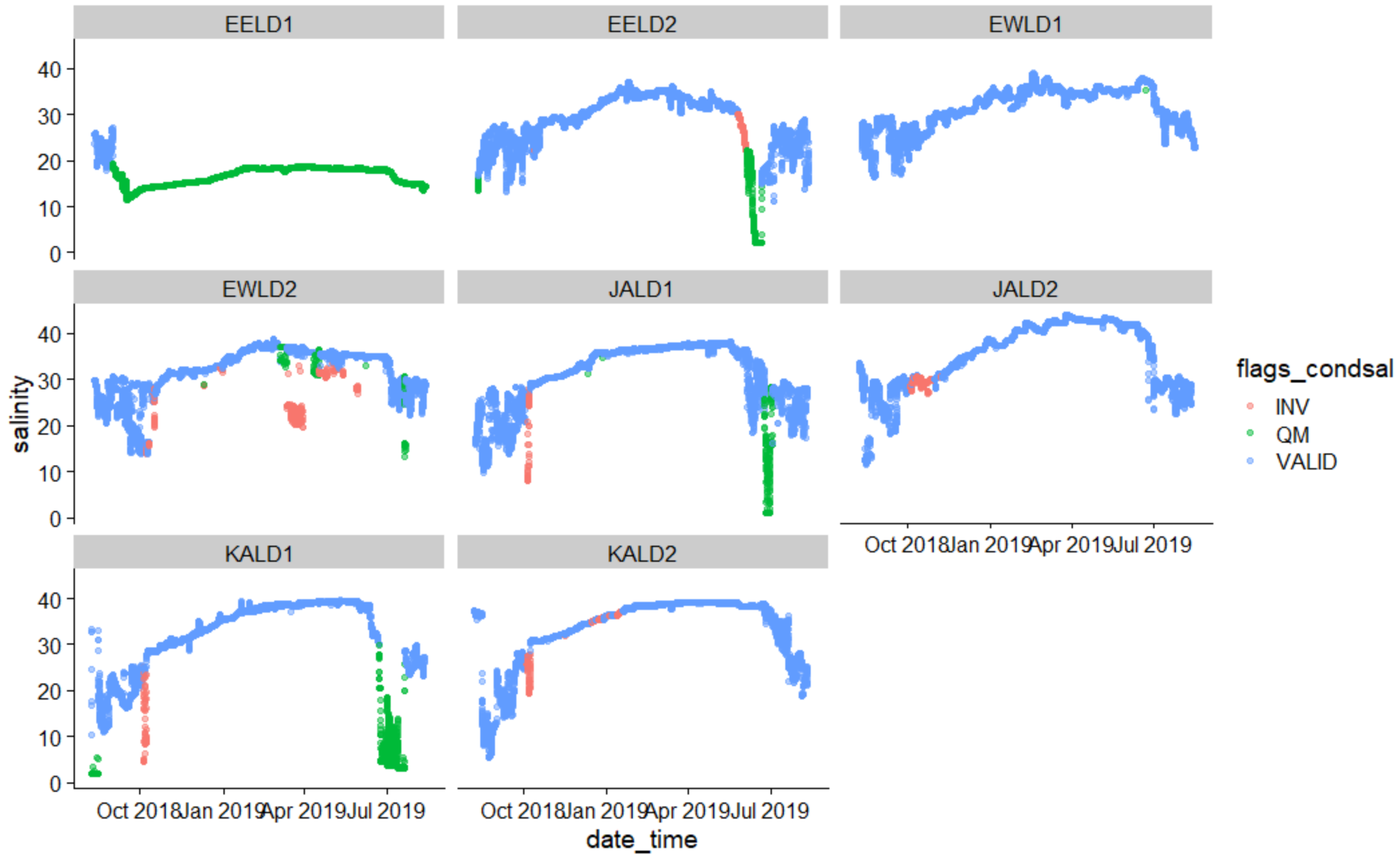


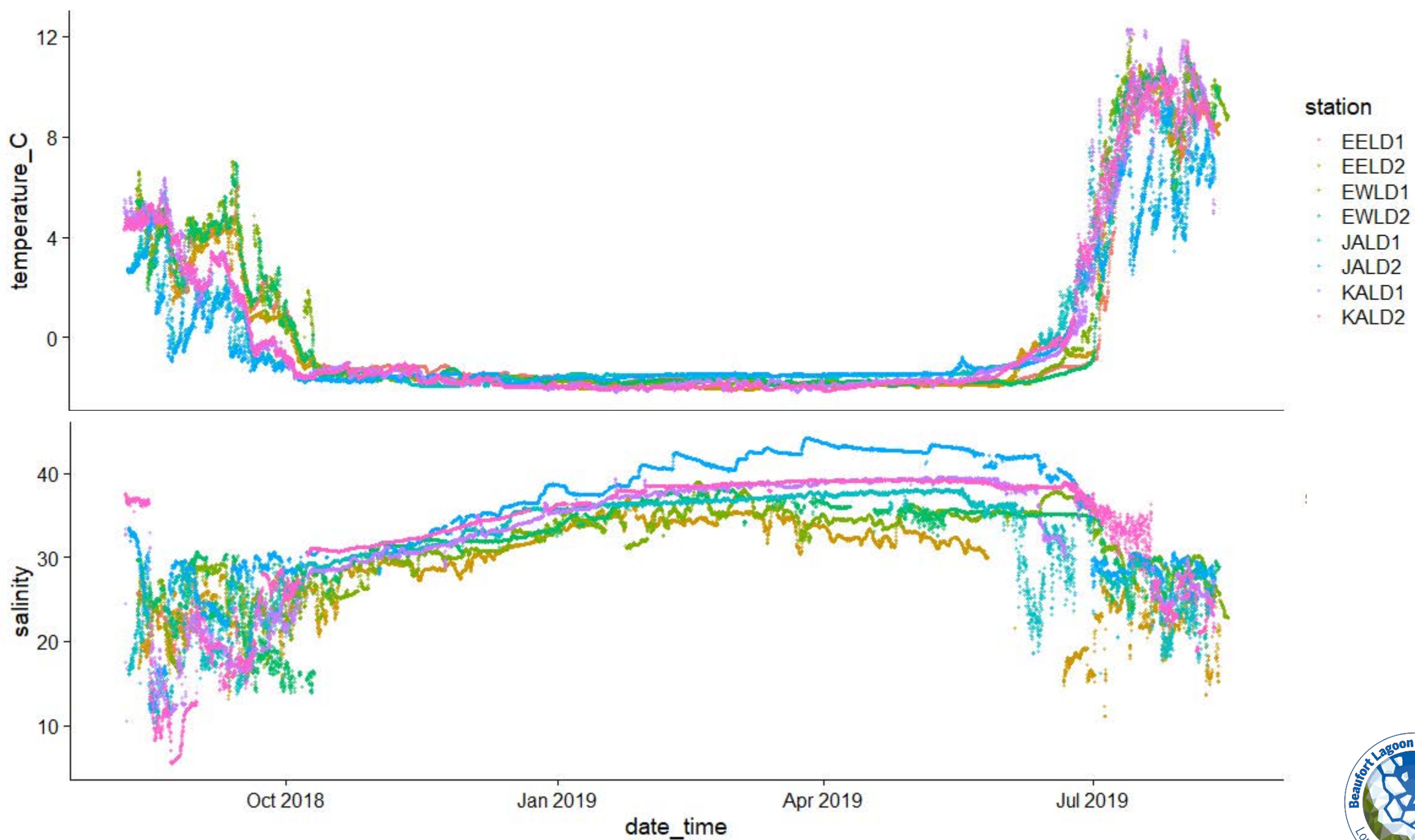
Can purrr::map



```
id_outlier(TS_flagged, "date_time", "temperature", "salinity")
```







ble.lternet.edu



BLE LTER Data Catalog

Search our catalog below, or find the same datasets archived at both the [Arctic Data Center](#) and [Environmental Data Initiative](#) repositories. Data are generally archived and released within two years of collection for public use. Metadata accompanying each dataset includes specific use policies. See also [LTER Data Policies](#).

Enter search term

Search

Found 14 results

[Carbon flux from aquatic ecosystems of the Arctic Coastal Plain along the Beaufort Sea, Alaska, 2010-2018](#)

Beaufort Lagoon Ecosystems LTER and V. Lougheed. Published 2020.

[Catalog of GenBank sequence read archive \(SRA\) entries of 16S and 18S rRNA genes from bacterial and protistan planktonic communities along the Eastern Beaufort Sea coast, North Slope, Alaska, 2011-2013](#)

Beaufort Lagoon Ecosystems LTER, C. Kellogg, J. McClelland, K. Dunton, and B. Crump. Published 2020.

[Carbon and nitrogen content and stable isotope compositions from particulate organic matter samples from lagoon, river, and open ocean sites along the Alaska Beaufort Sea coast, 2018-ongoing](#)

Beaufort Lagoon Ecosystems LTER, Core Program. Published 2020.

ble.lternet.edu/catalog



Acknowledgements

Funding

National Science
Foundation

Partners

U. S. Long Term Ecological
Research Network
Ukpeagvik Inupiat Corporation
(UIC Science)
Kaktovik Inupiat Corporation &
residents of Kaktovik
Polar Field Services

Collaborators

An Nguyen
Nathan McTigue



Thank you!

**ble.lternet.edu
github.com/BLE-LTER**

**BLE Twitter: [@ArcticLagoons](https://twitter.com/ArcticLagoons)
Christina's Twitter: [@c_bonsell](https://twitter.com/c_bonsell)**