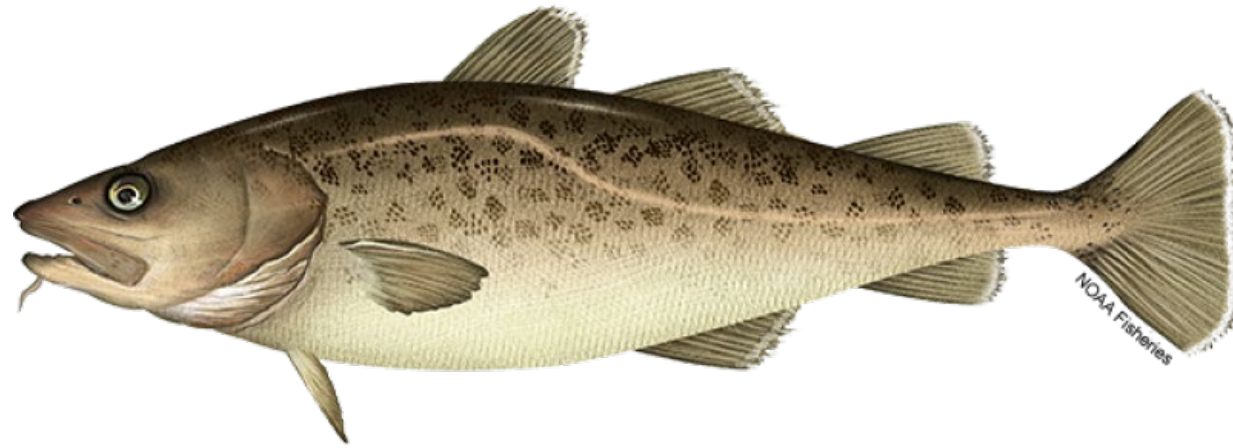
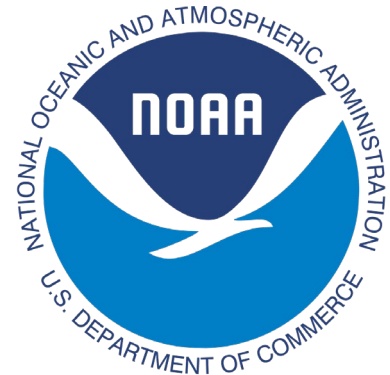


A new temperature metric for temperature-varying catchability of Gulf of Alaska Pacific cod



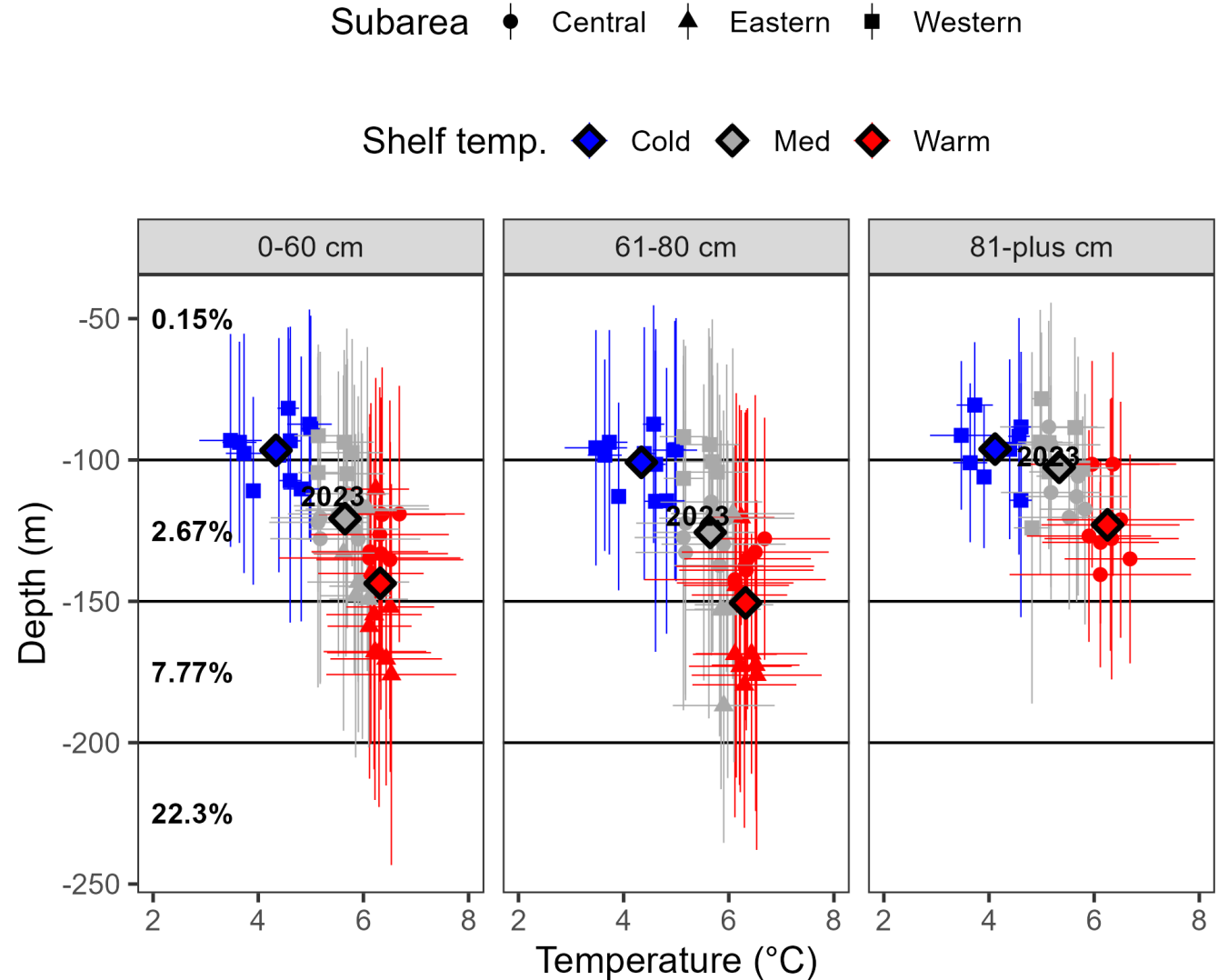
Presented by Krista Oke

Coauthors: Pete Hulson, Steve Barbeaux, and Brad Harris



Adult Pacific cod move into deeper during warm conditions

- The Gulf of Alaska stock assessment model includes a temperature-at-depth link on longline survey catchability
- June temperature-at-depth estimates from CFSR, an ocean model
 - Older model
 - Very difficult on assessment timeline



Project goals

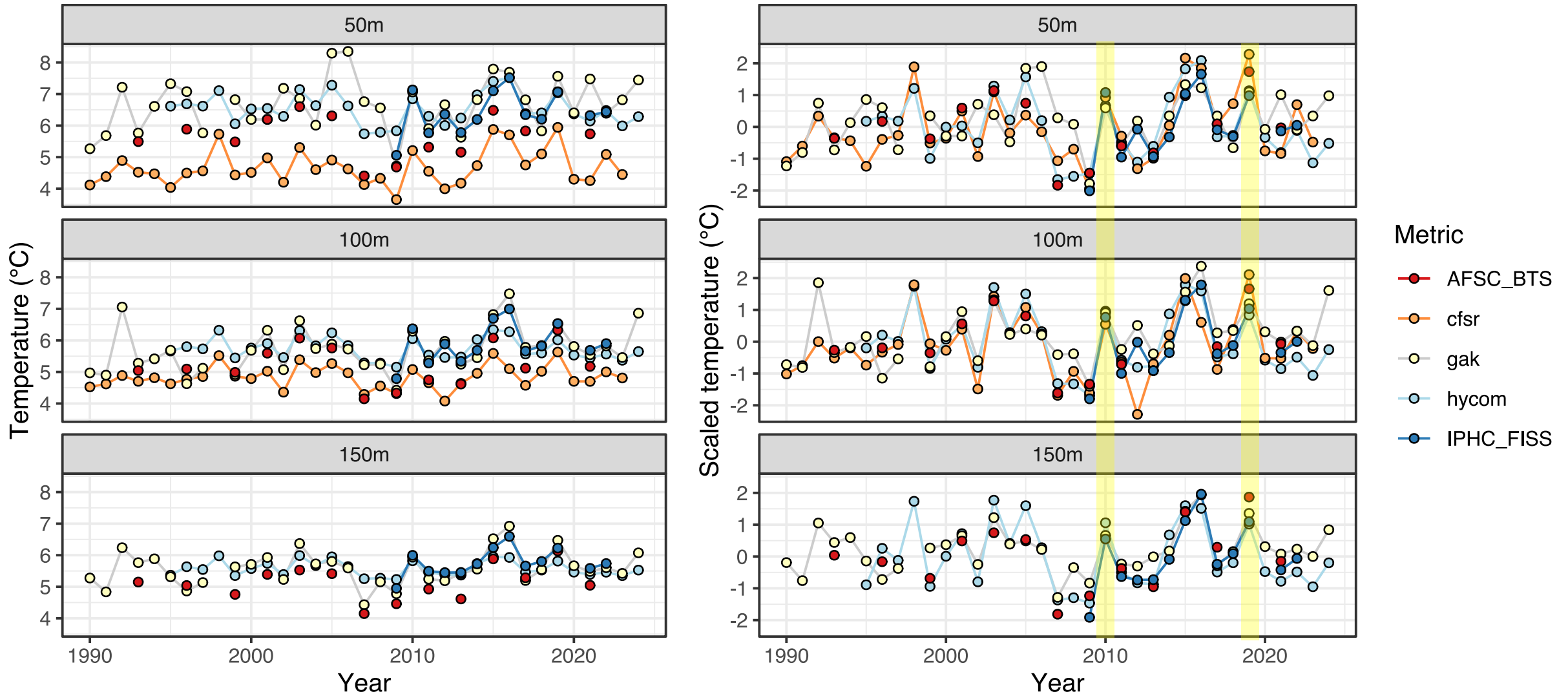
- Investigate other potential metrics for temperature-at-depth in the Gulf of Alaska
- Determine whether an alternative metric could provide similar or better assessment model fit
- Investigate whether temperature measurements/estimates from other depths or months could improve assessment model fit

The metrics

- In situ
 - AFSC bottom trawl survey
 - IPHC setline survey
 - GAK1 (mooring and monthly CTD)
- Model-derived
 - Climate Forecast System Reanalysis (CFSR)
 - global, high resolution, coupled atmosphere-ocean-land surface-sea ice system
 - HYbrid Coordinate Ocean Model or HYCOM
 - data-assimilative hybrid isopycnal-sigma-pressure (generalized) coordinate ocean model

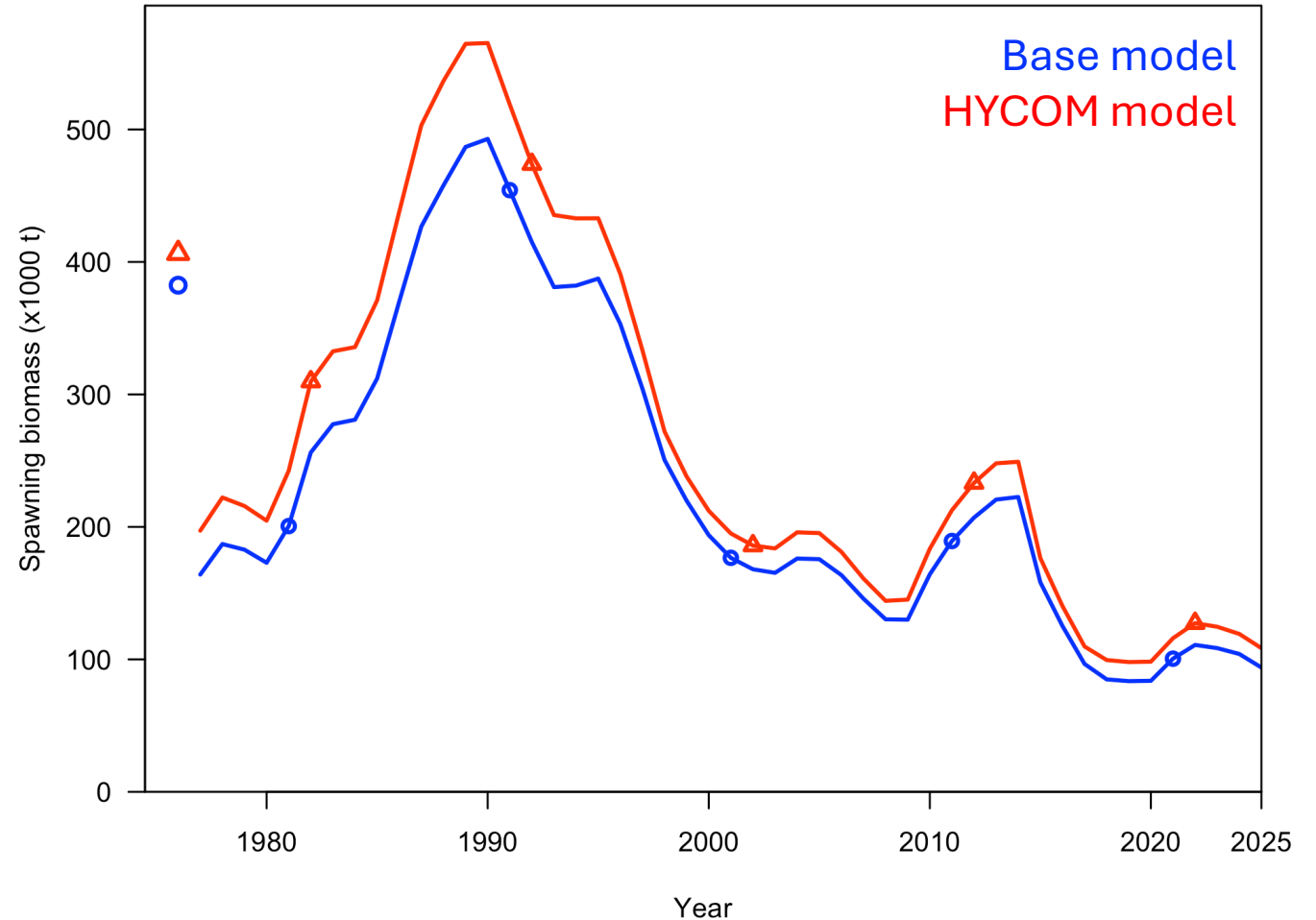


Differences in absolute temperatures, but similar trends

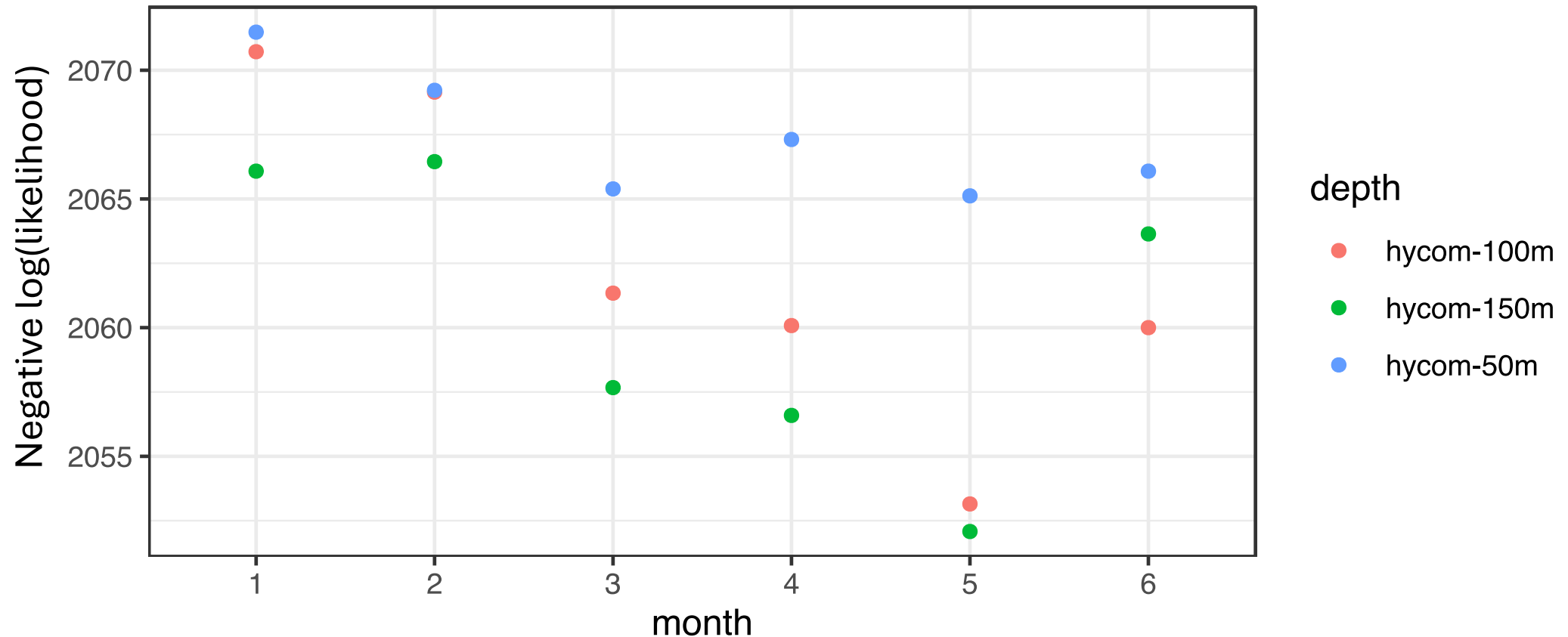


HYCOM provides meaningful improvement in stock assessment model

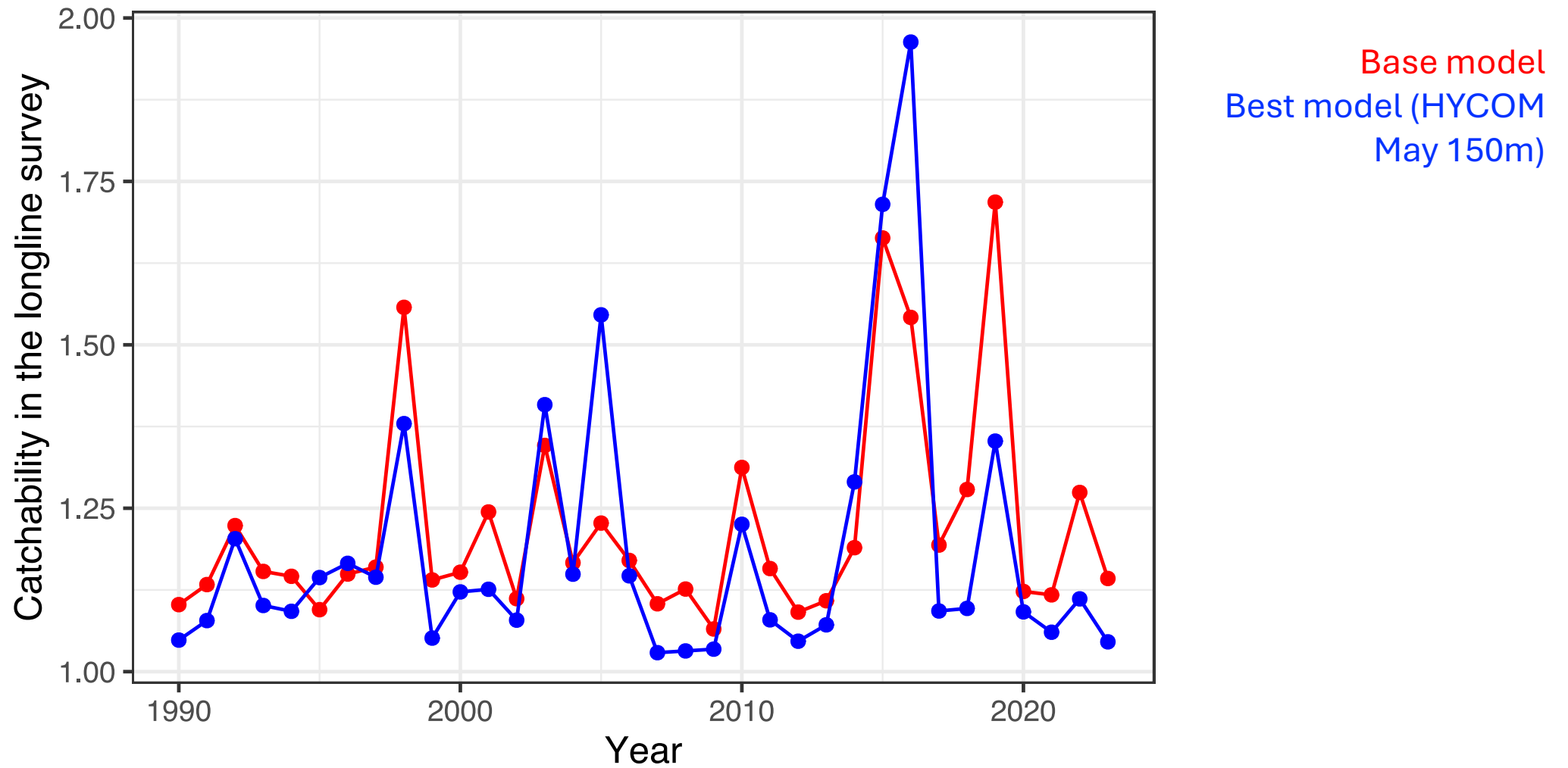
- Lower total negative log(likelihood) (2067.0) than the current base model that includes temperature estimates from CFSR (2069.5)
- Mostly through improved fit to longline survey, though worse fit to bottom trawl survey



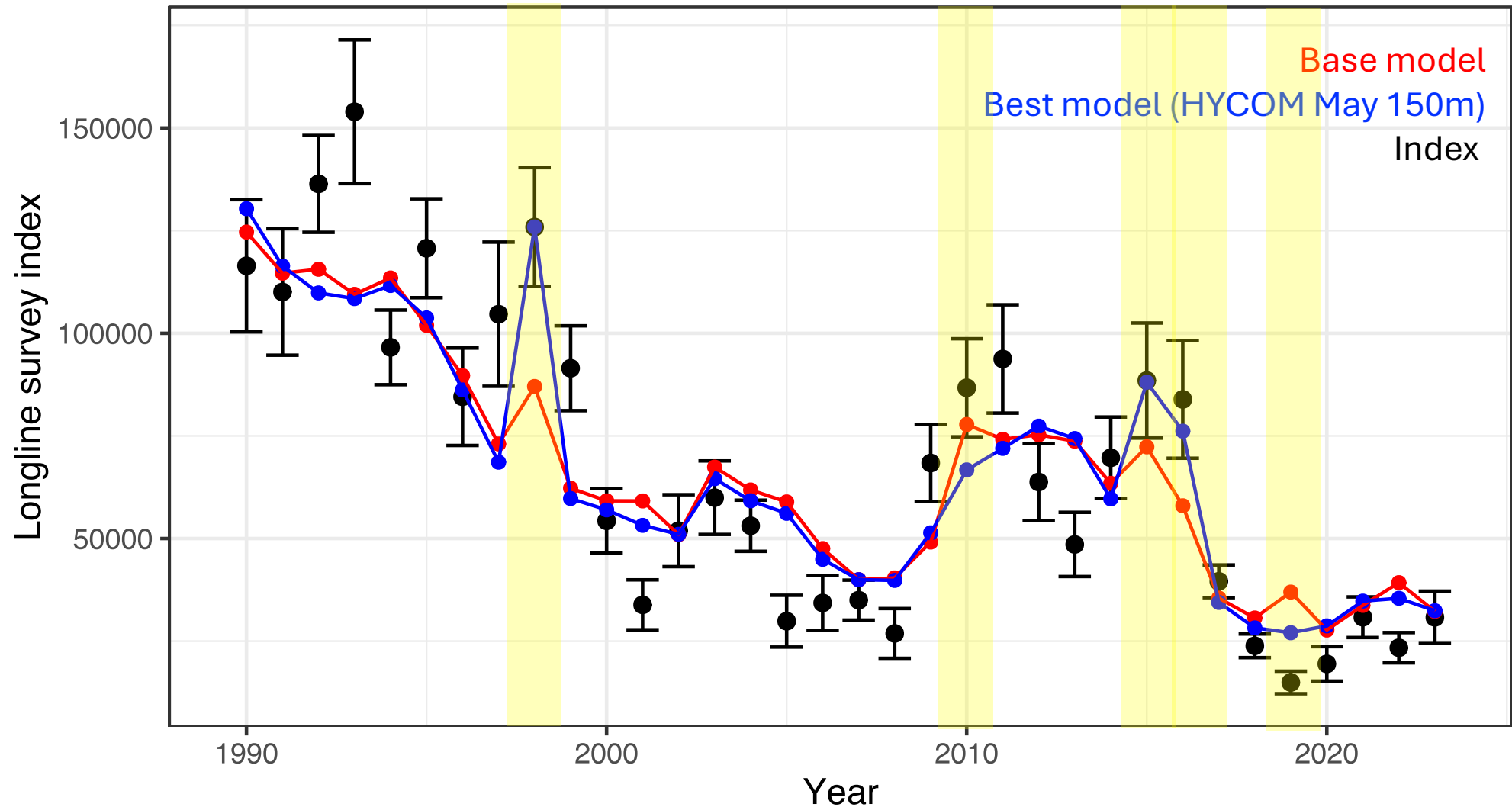
Does using temperature from different depth or month improve fit?



Catchability



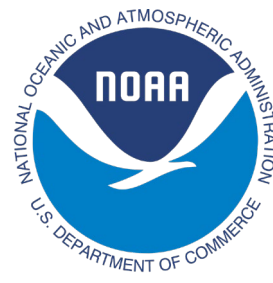
HYCOM (especially May 150m) improves fit to longline survey



Next steps

- HYCOM provides a promising and easier to access alternative to CFSR
 - Both share drawbacks associated with model derived-estimates
 - Code and data (to date) available through this project
- We are replacing CFSR temperature estimates with HYCOM May 150m temperature estimates

Acknowledgements



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- Data used in this project include many ocean and earth systems models, thank you to those who build and run these models and who make their output available; thank you to Kevin Siwicke for providing code to access and download HYCOM data
- Thank you to Seth Danielson and UAF collaborators for data from the GAK1 mooring and cruise CTD casts