Deep Intraseasonal Variability in the Central Equatorial Atlantic

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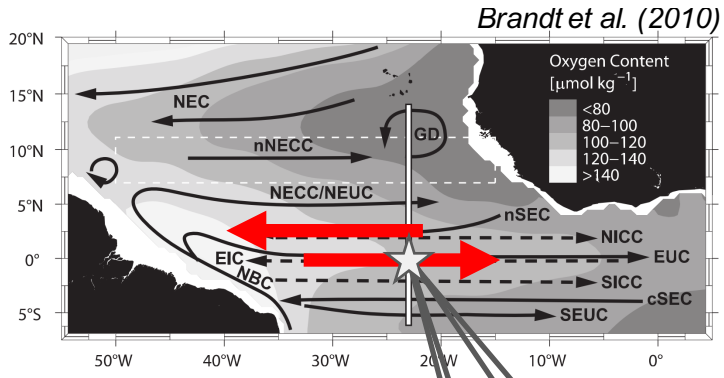
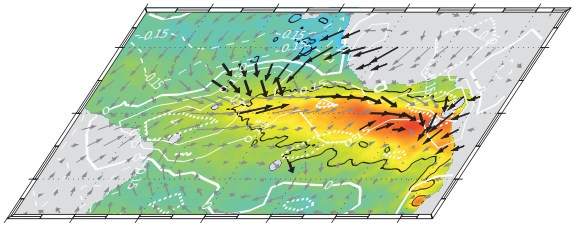
Equatorial Atlantic Variability

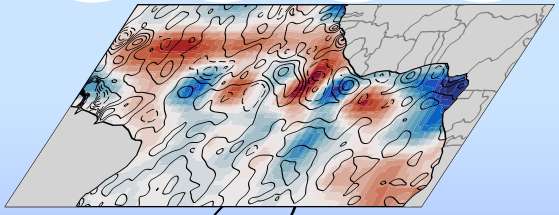




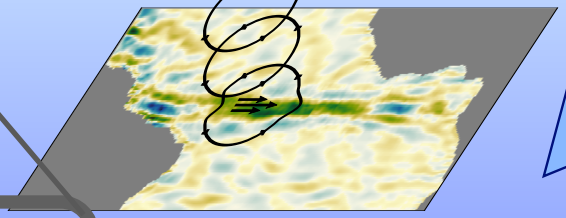
climate predictability

mean wind-driven circulation

tropical instability waves



interannual surface variability

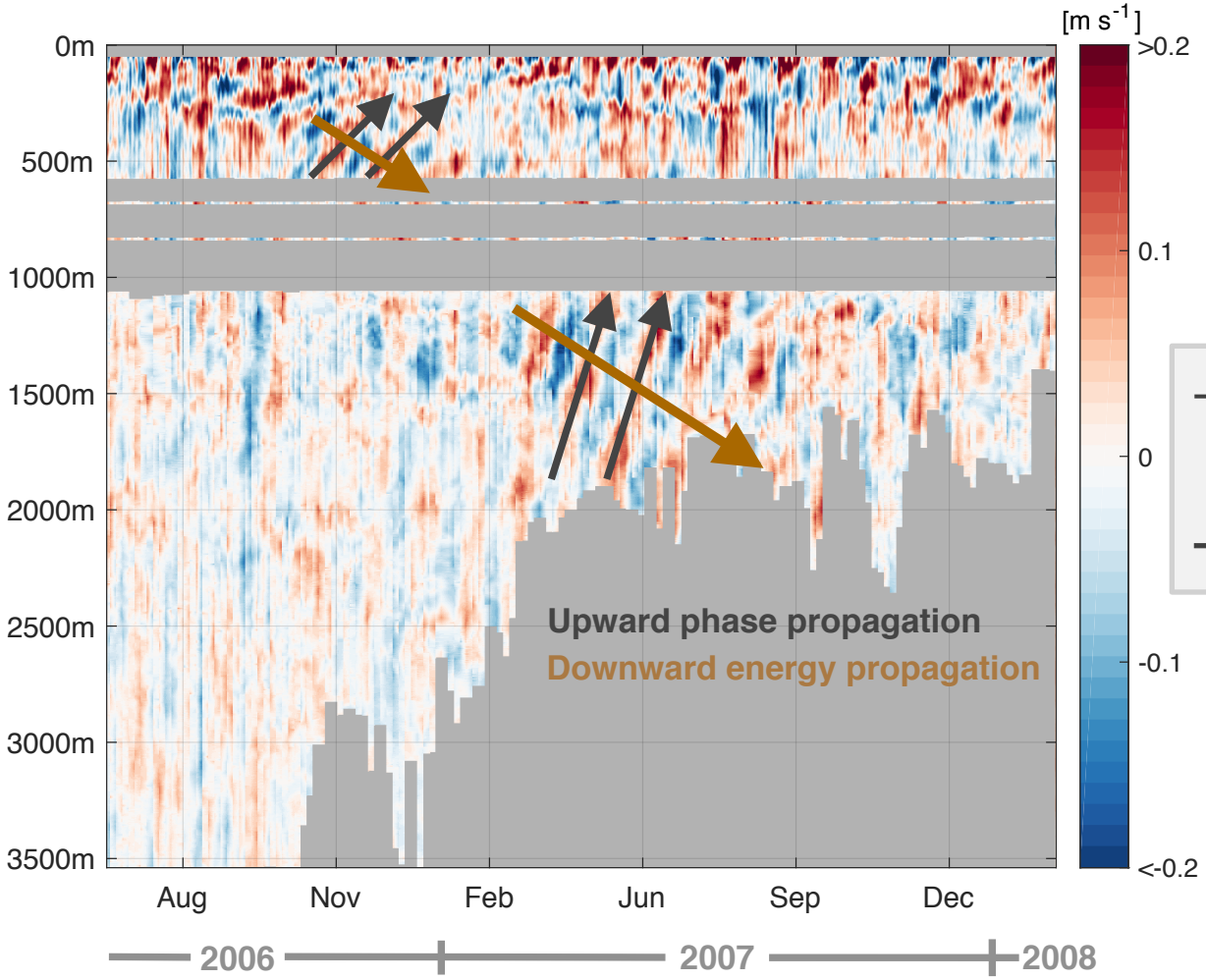


deep intra-seasonal variability

equatorial deep jets

by courtesy of Martin Claus

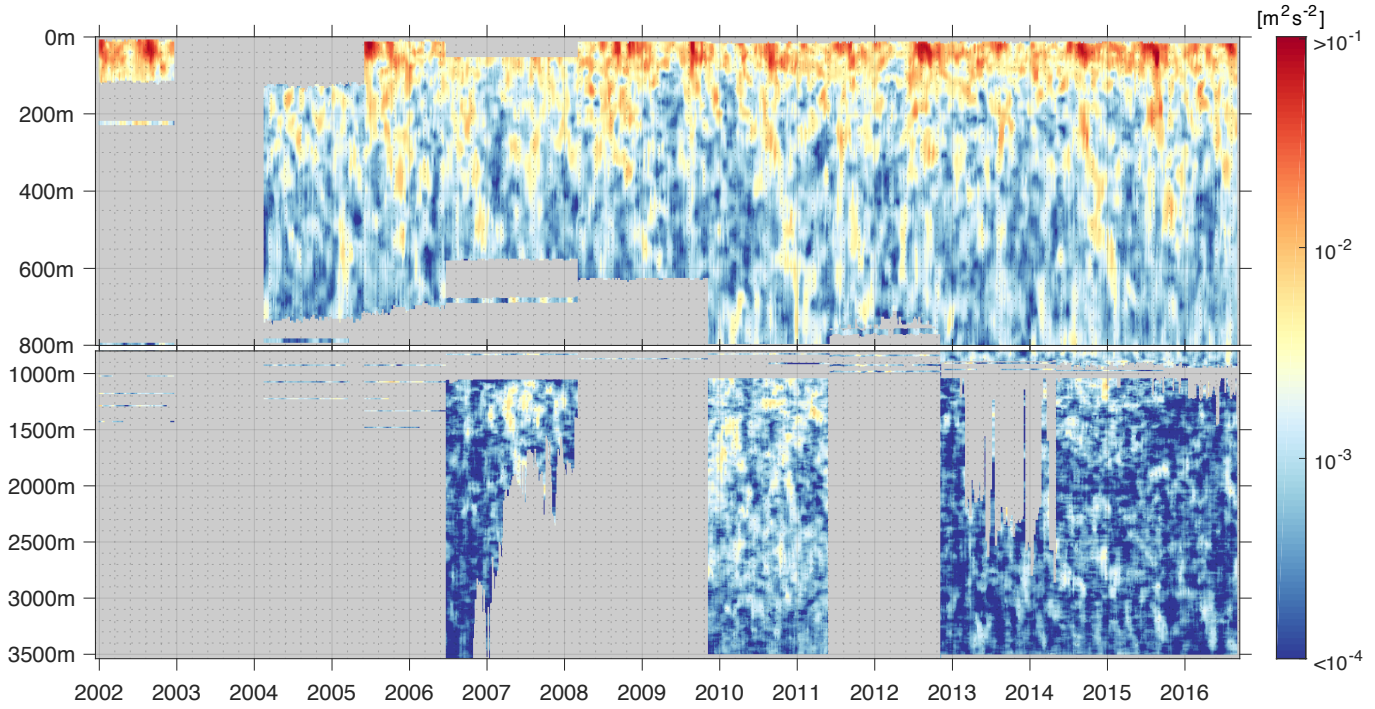
Meridional velocity observations



→ **Energy source(s) ?**

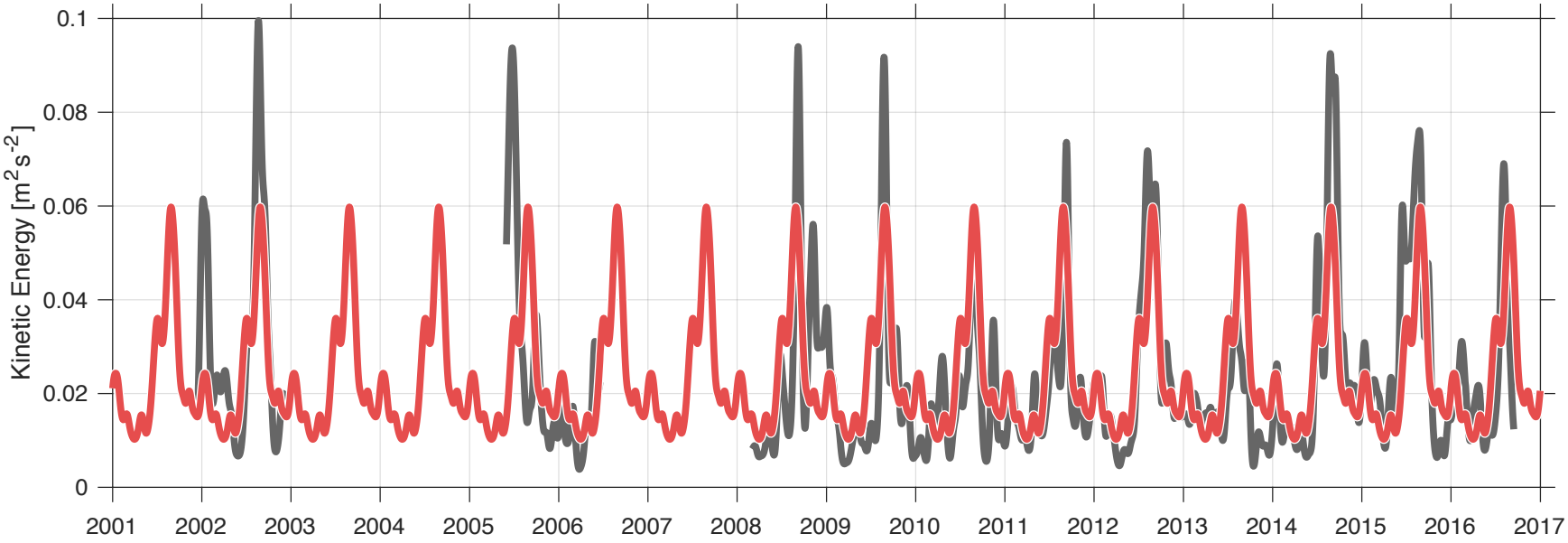
→ **Propagation mechanism ?**

Data distribution – Kinetic energy



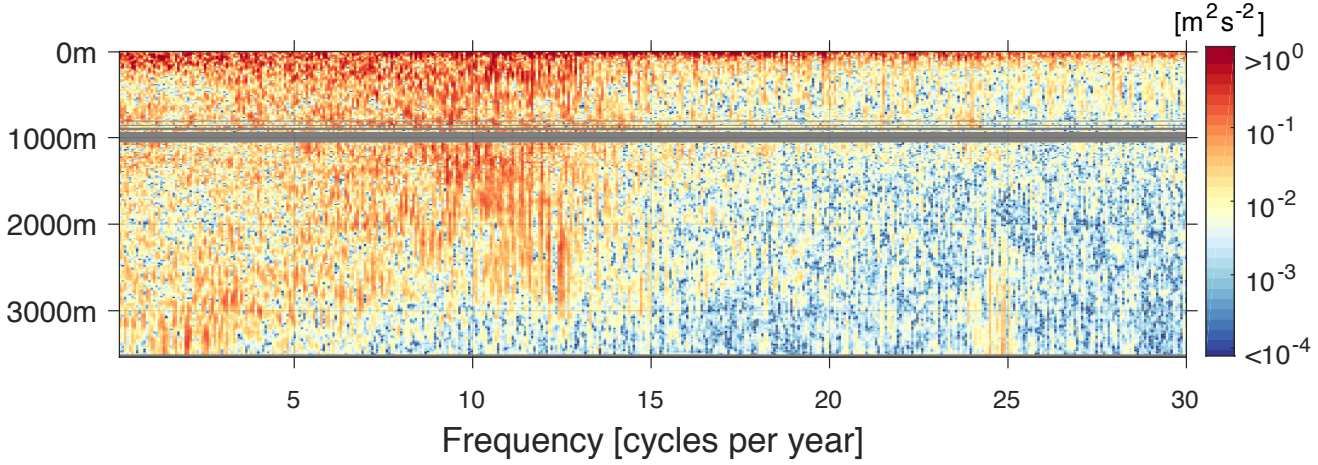
- Almost 15 years of velocity data from an equatorial mooring at 23°W
- Gaps in the data coverage introduce uncertainty
- High kinetic energy close to the surface → downward propagation

Seasonal cycle of TIWs

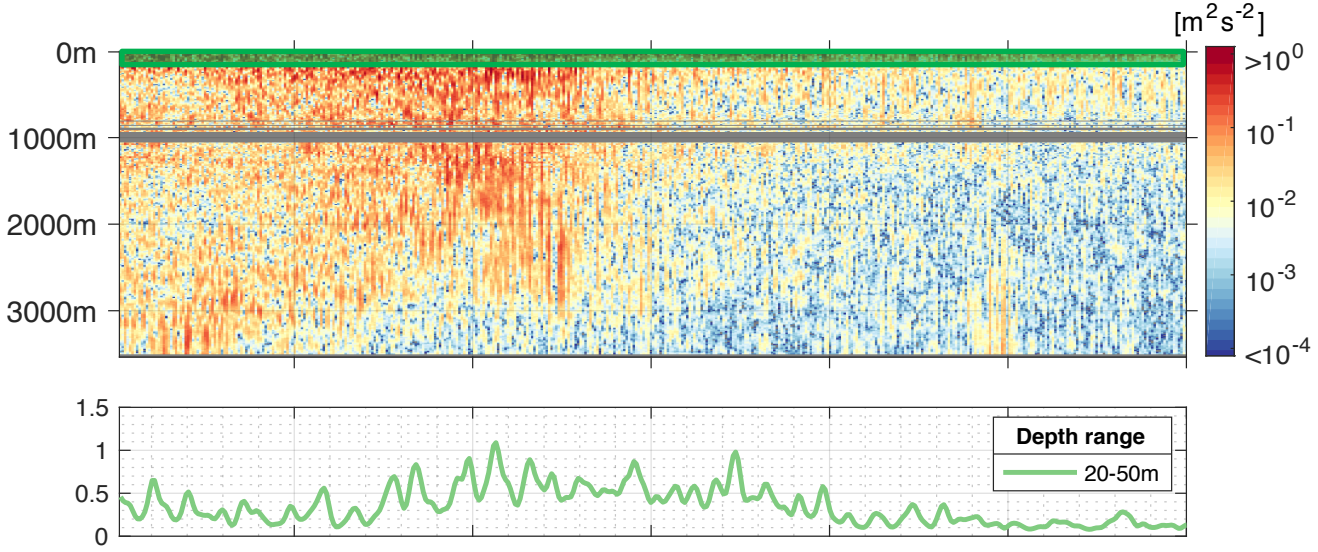


- Consistent annual maximum in boreal summer (August)
- Remarkable year-to-year variations of the annual intensification
- Weaker maximum in boreal winter (January)

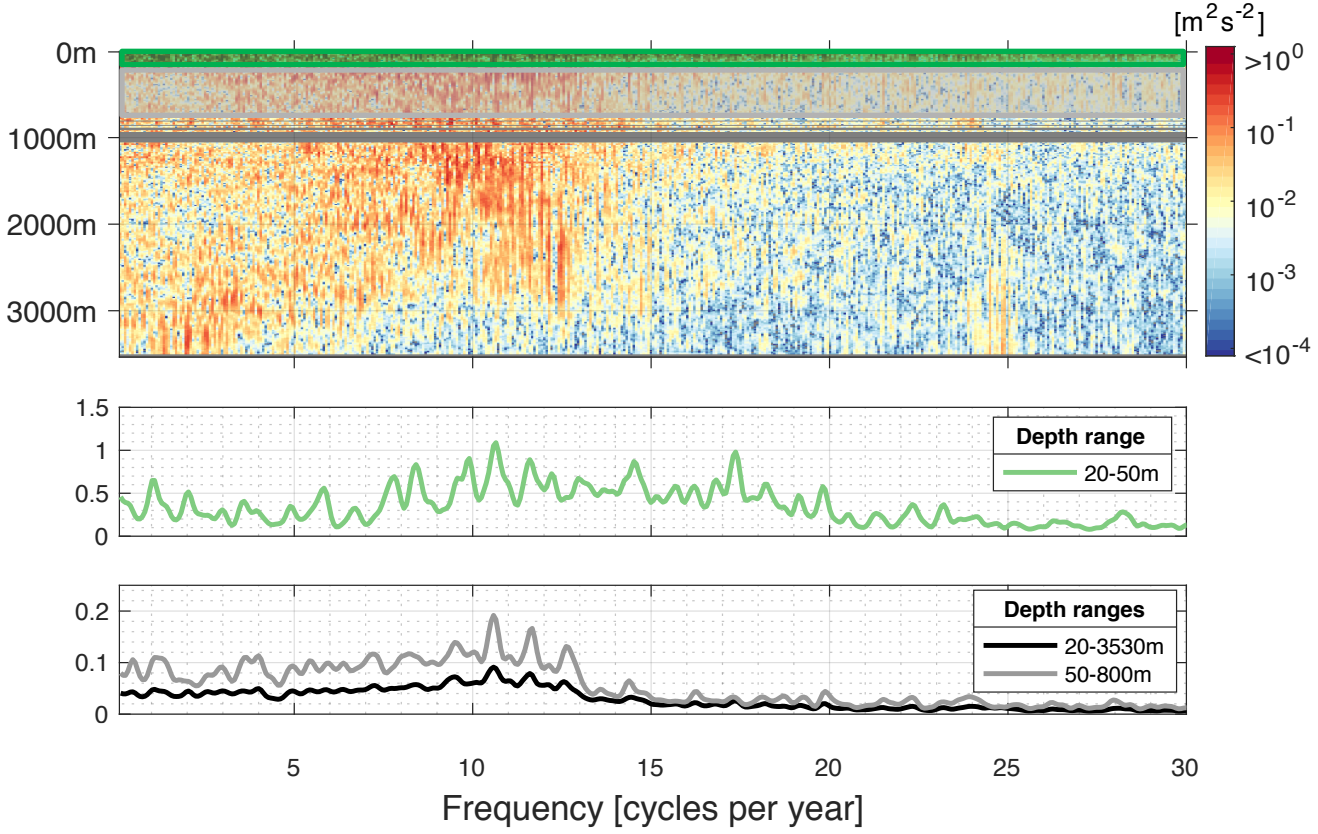
DEIV in the central Atlantic Ocean



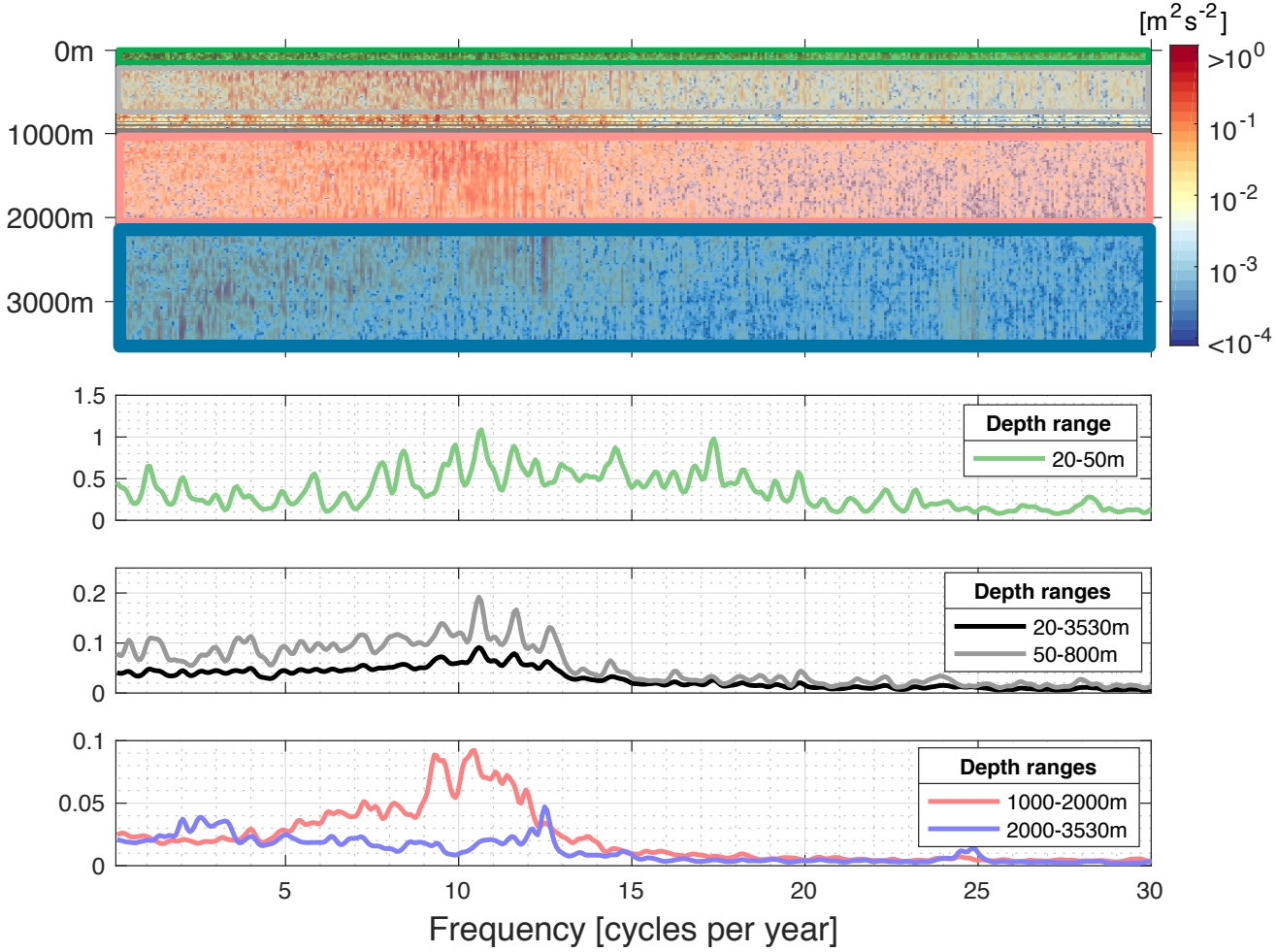
DEIV in the central Atlantic Ocean



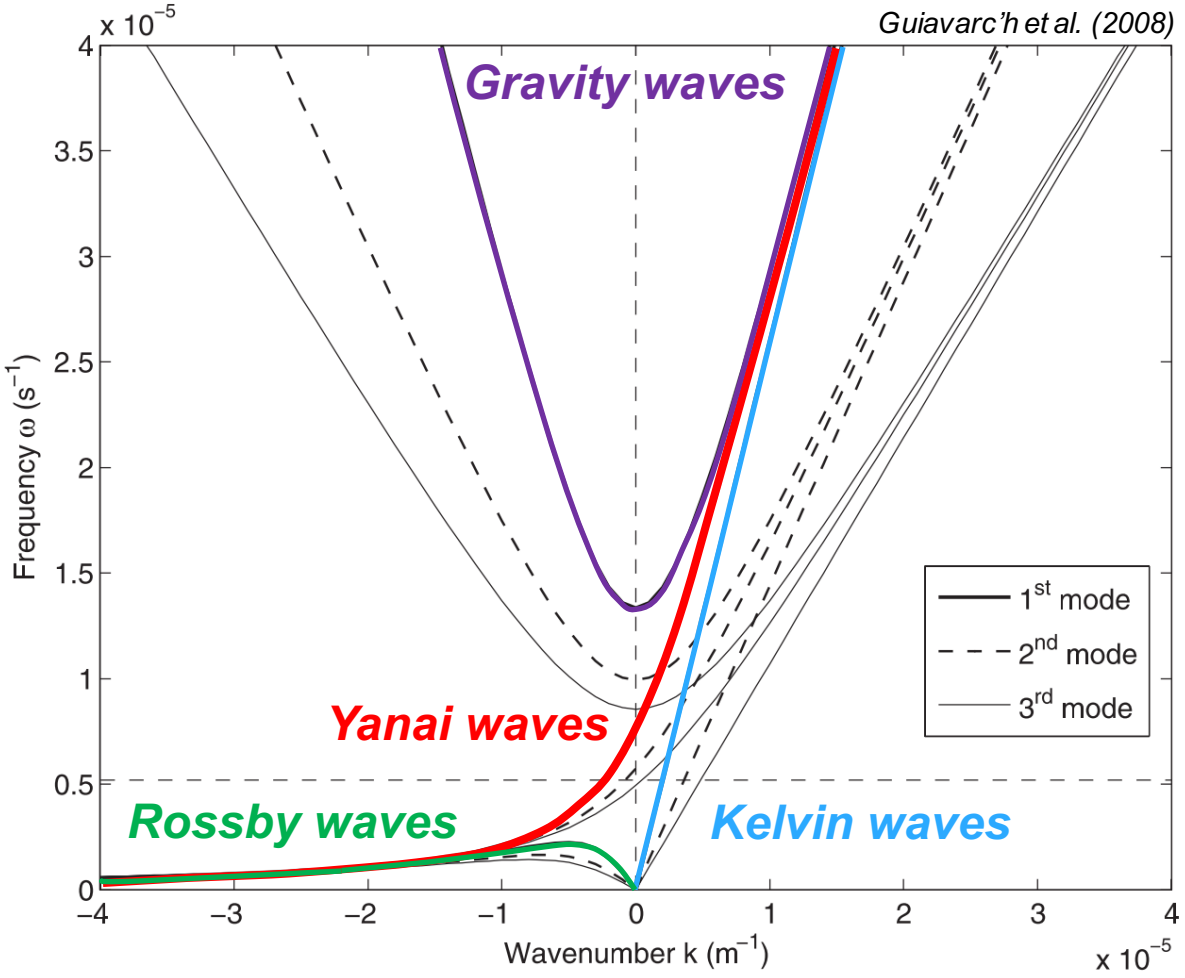
DEIV in the central Atlantic Ocean



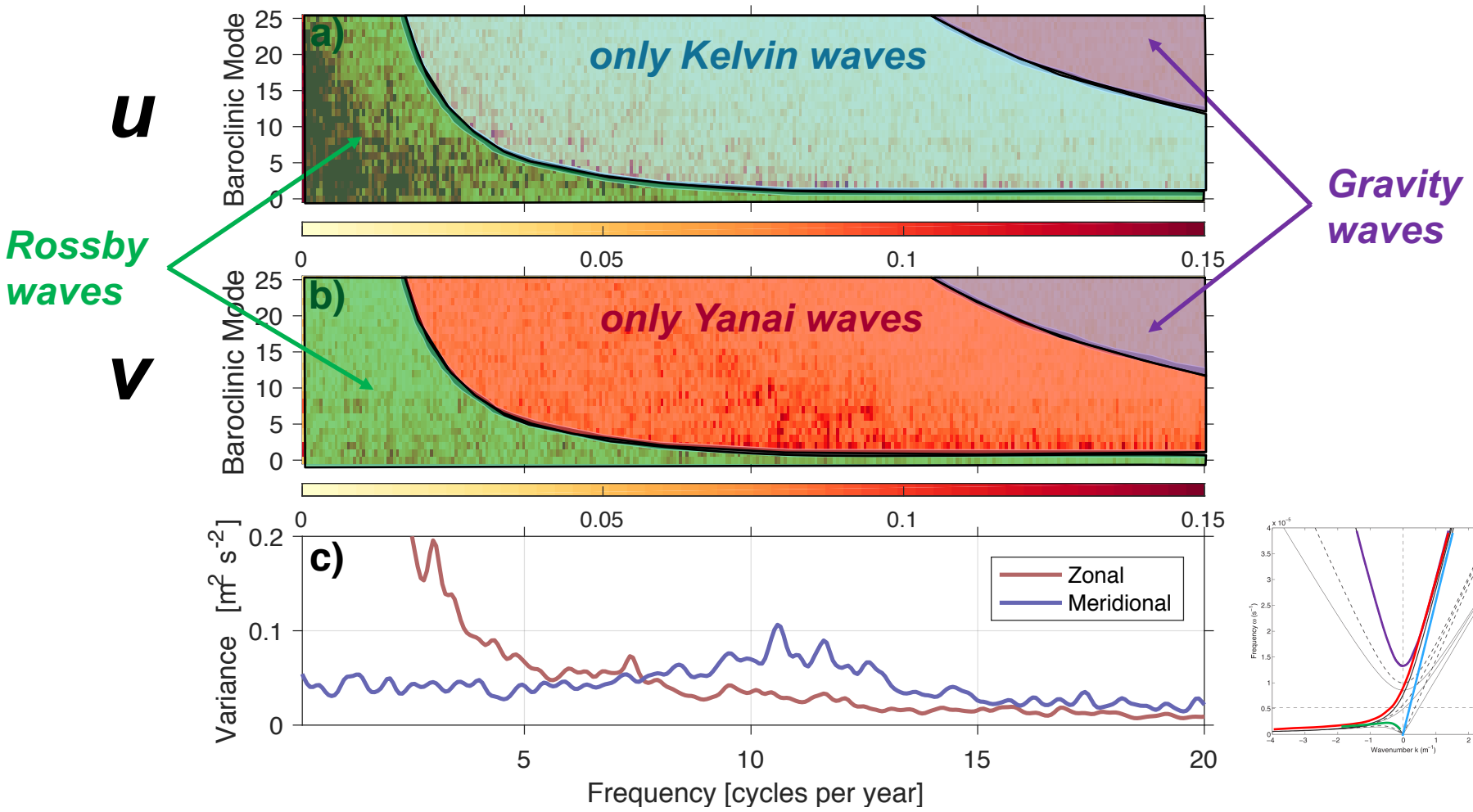
DEIV in the central Atlantic Ocean



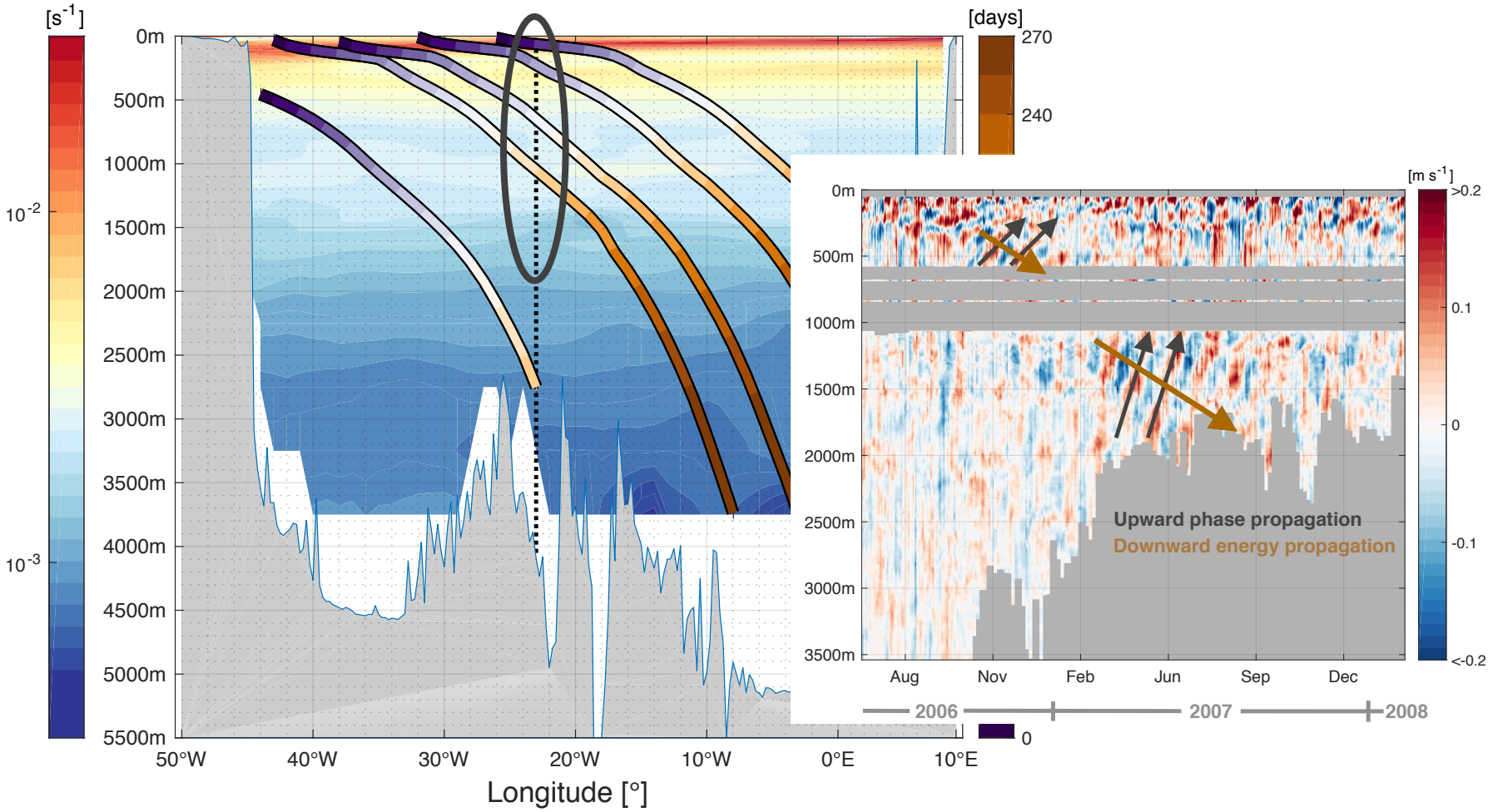
Equatorial waves



Modal decomposition of ***u*** and ***v***

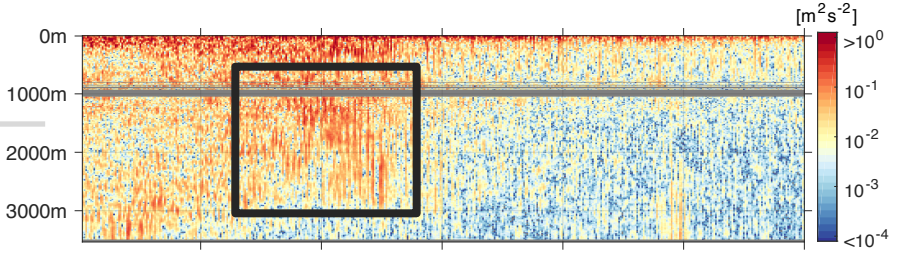


Yanai beams – energy pathways

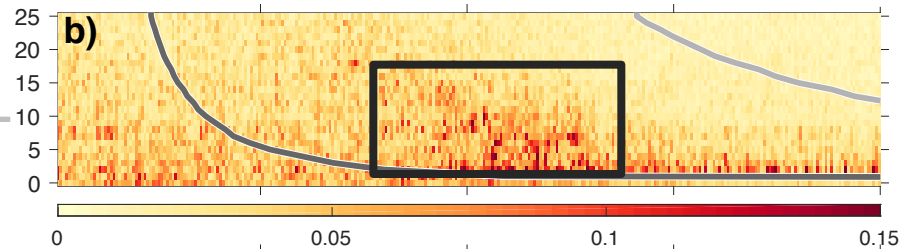


Conclusions

- At the equator: intraseasonal variability is observed down to 2000 m



- A modal decomposition shows that mainly Yanai waves are responsible for the observed variability



- Intraseasonal wave energy is propagated east- and downward along Yanai beams