

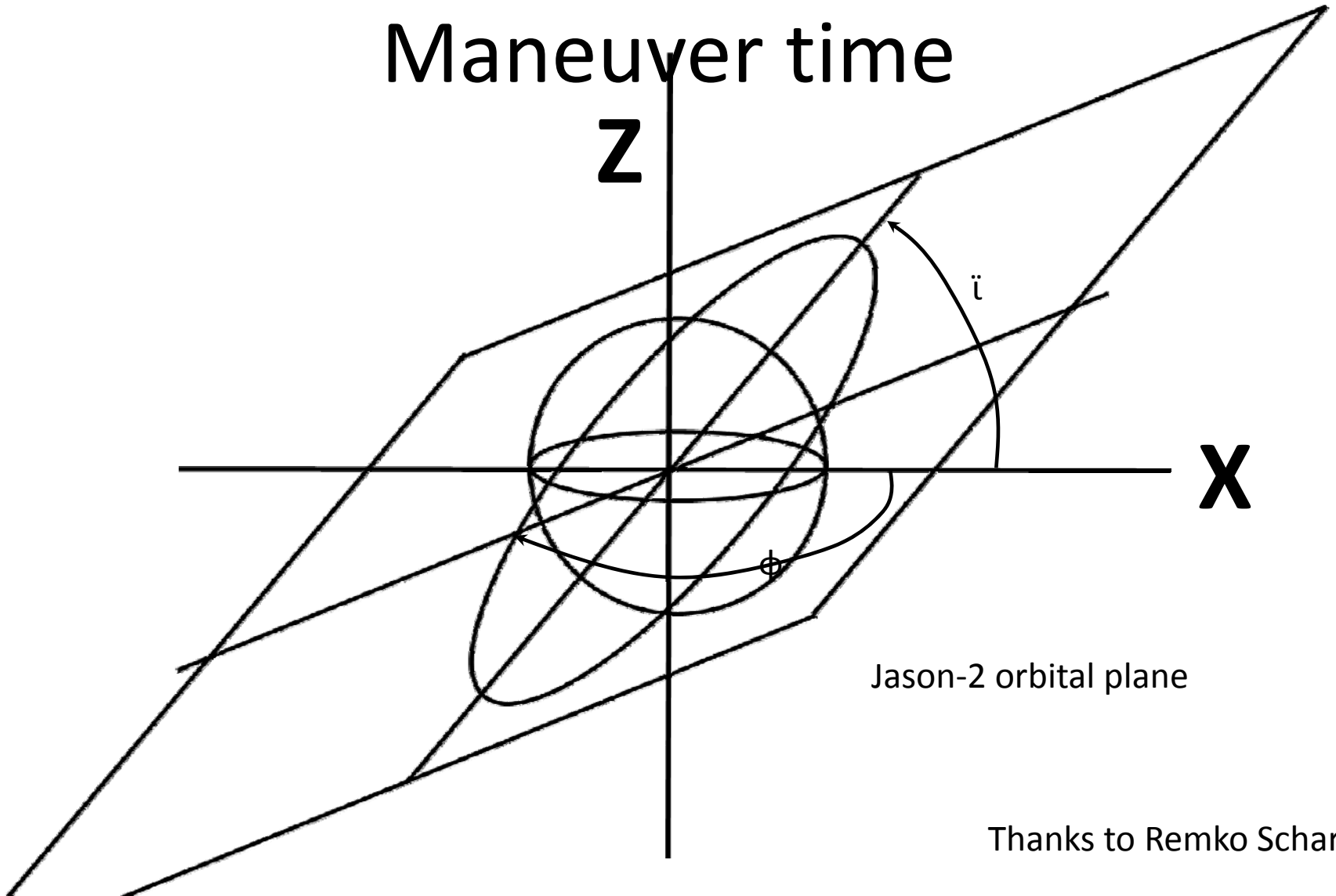
Phasing Considerations

Physical constraints
Sampling capabilities

Physical constraints

ΔV availability

Maneuver time



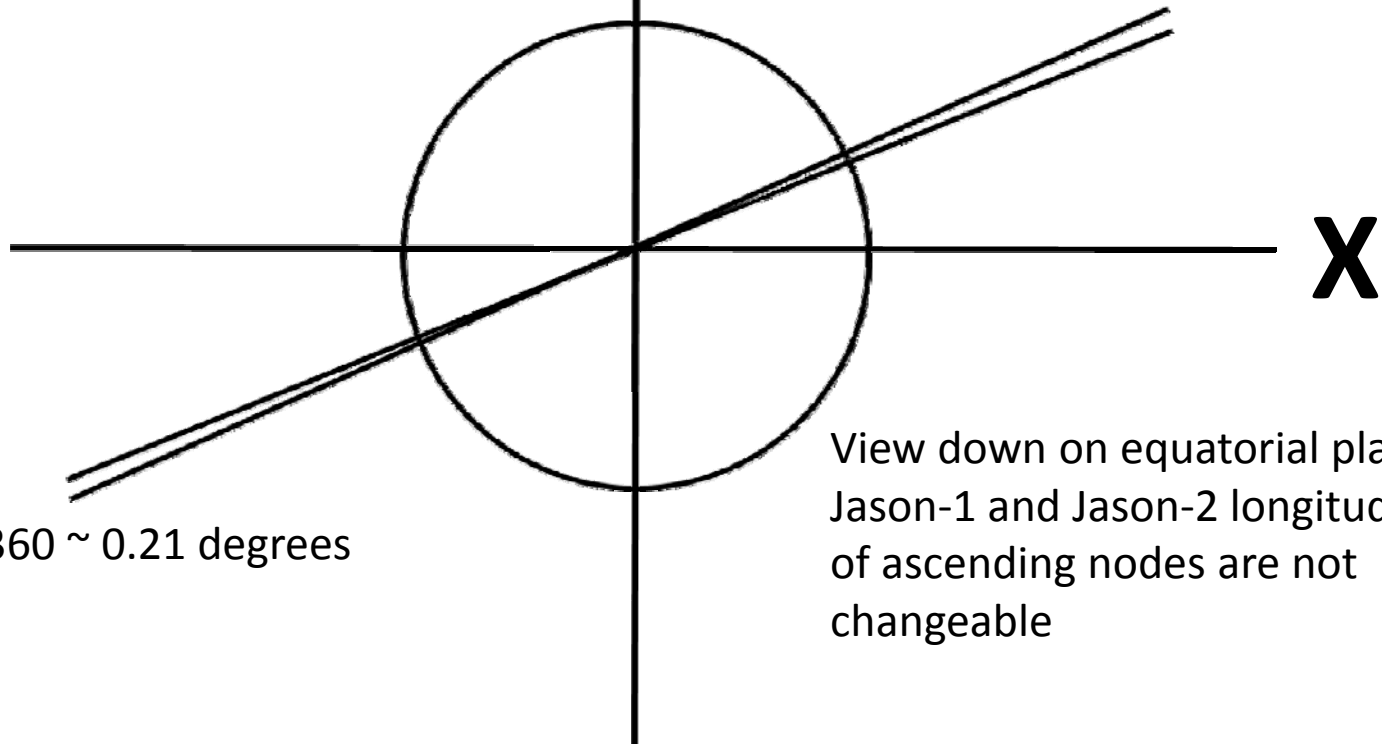
Thanks to Remko Scharoo

Physical constraints

ΔV availability

Maneuver time

Y

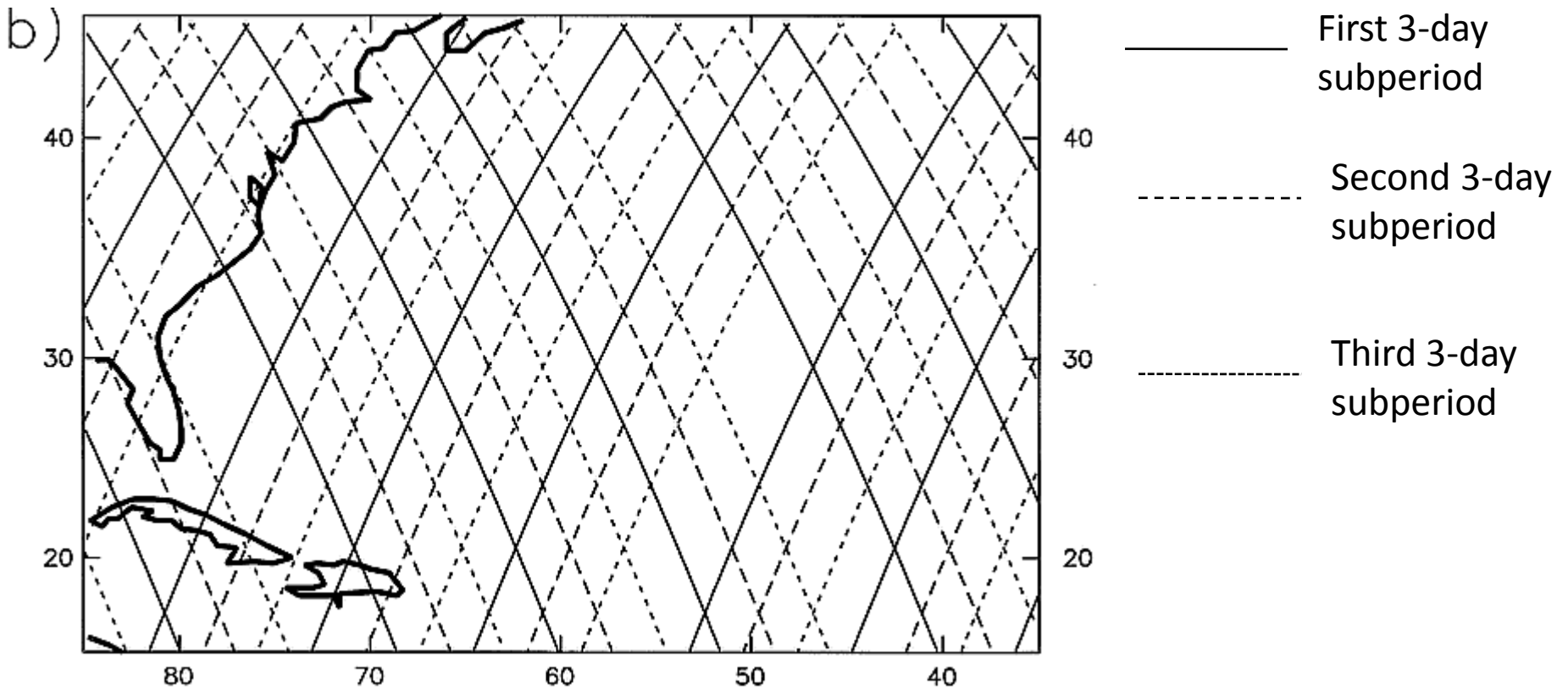


View down on equatorial plane.
Jason-1 and Jason-2 longitude
of ascending nodes are not
changeable

$$\Delta\phi = 50s/24h * 360 \sim 0.21 \text{ degrees}$$

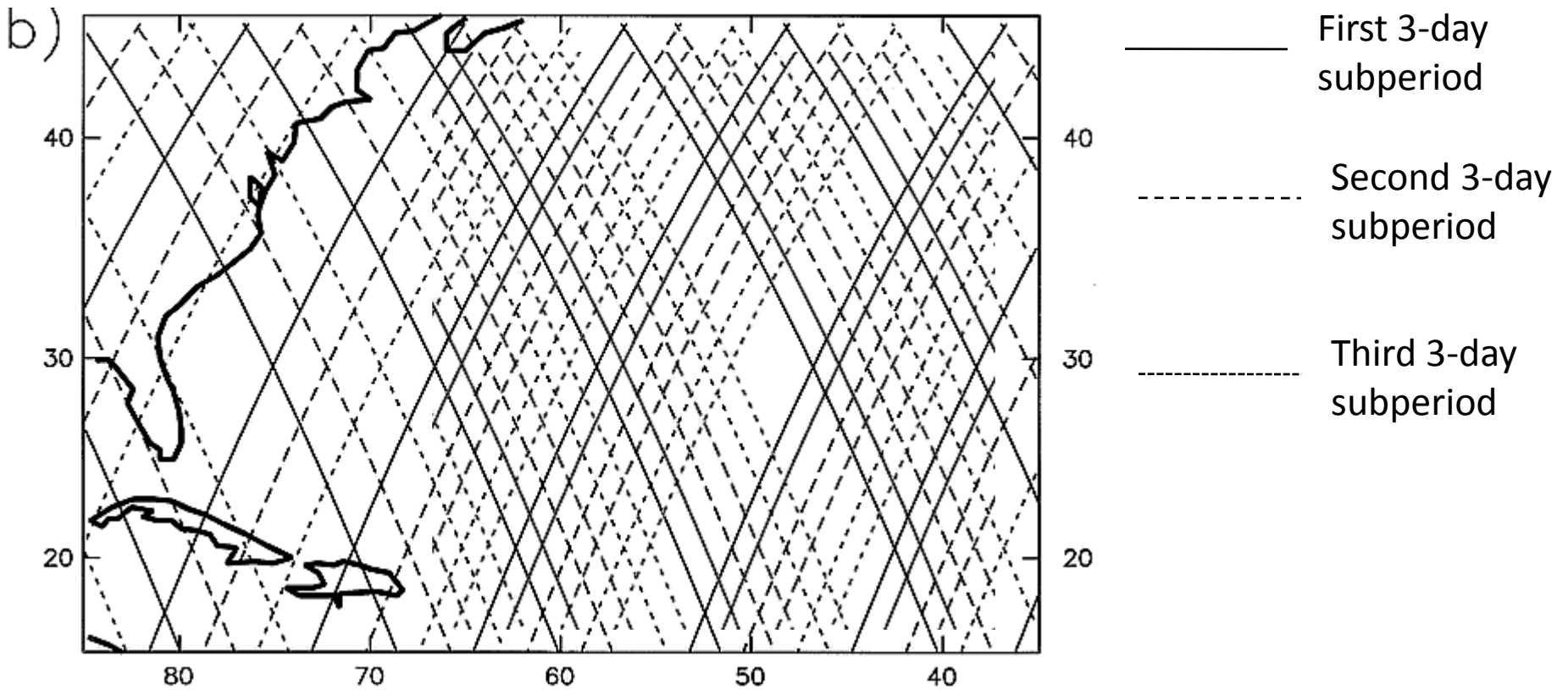
One possible phasing (1)

Shift Jason-1 to the right



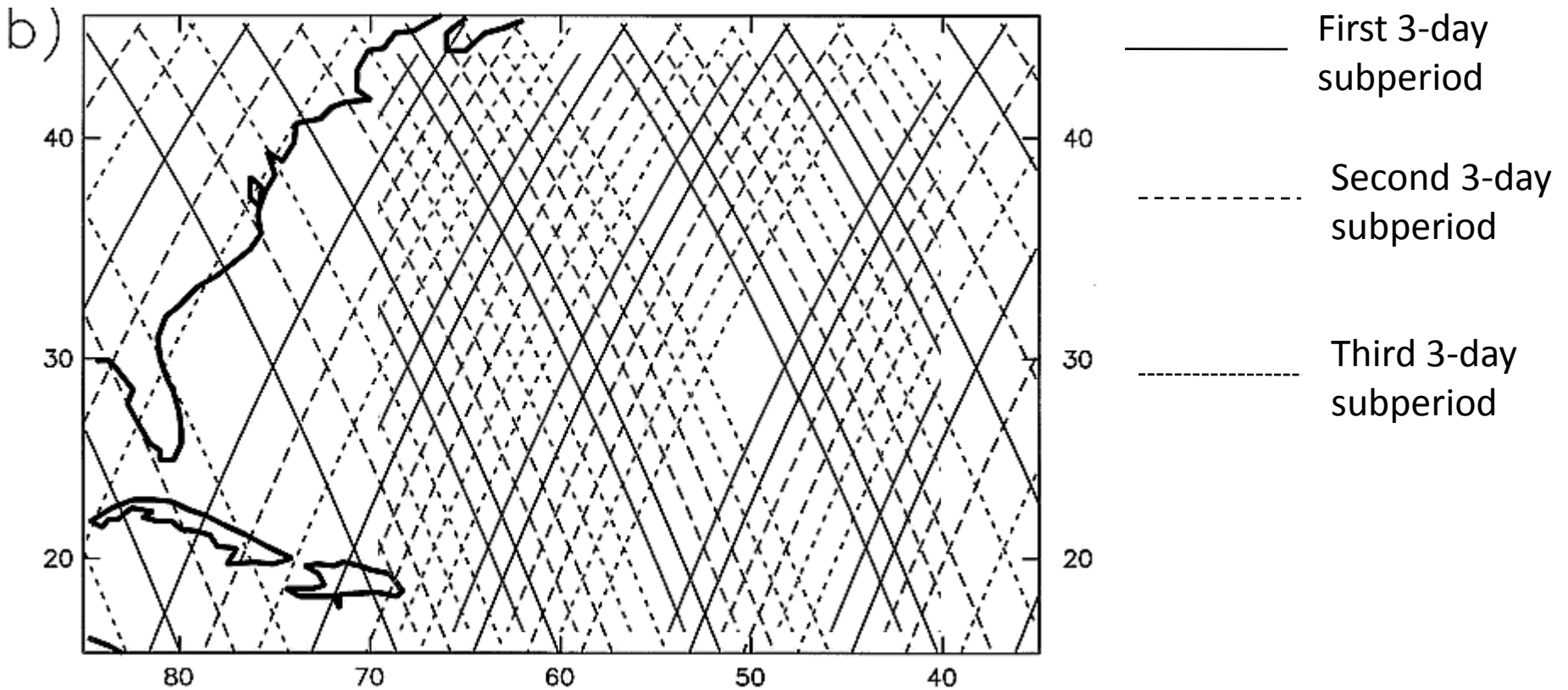
One possible phasing (1)

Shift Jason-1 to the right



One possible phasing (2)

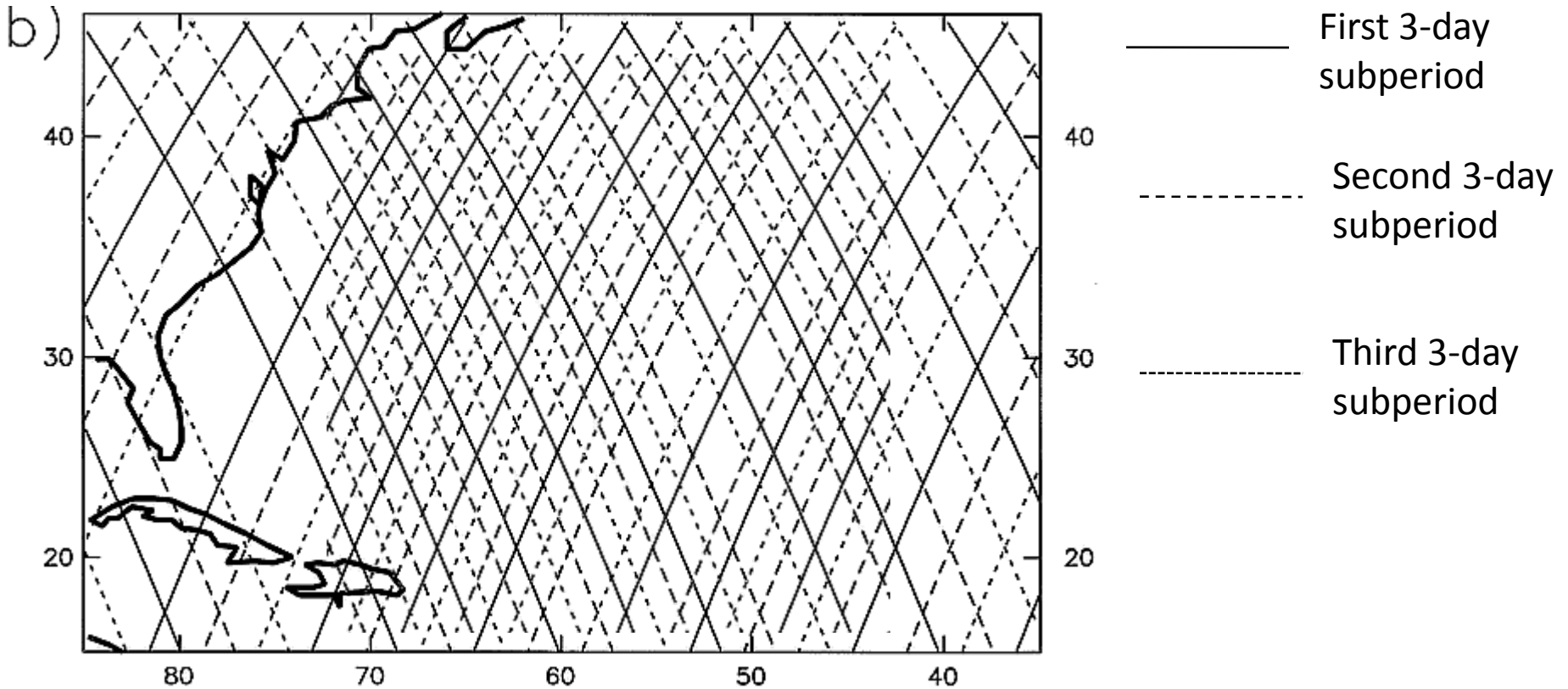
Shift Jason-1 to the left



In many ways, this is the same as the previous

One possible phasing (3)

Shift Jason-1 to the middle



Puts Jason-1 and Jason-2 as far apart as possible in space during a 3-day subcycle, though subcycle propagates westward

For mesoscale, 1 or 2 is preferred

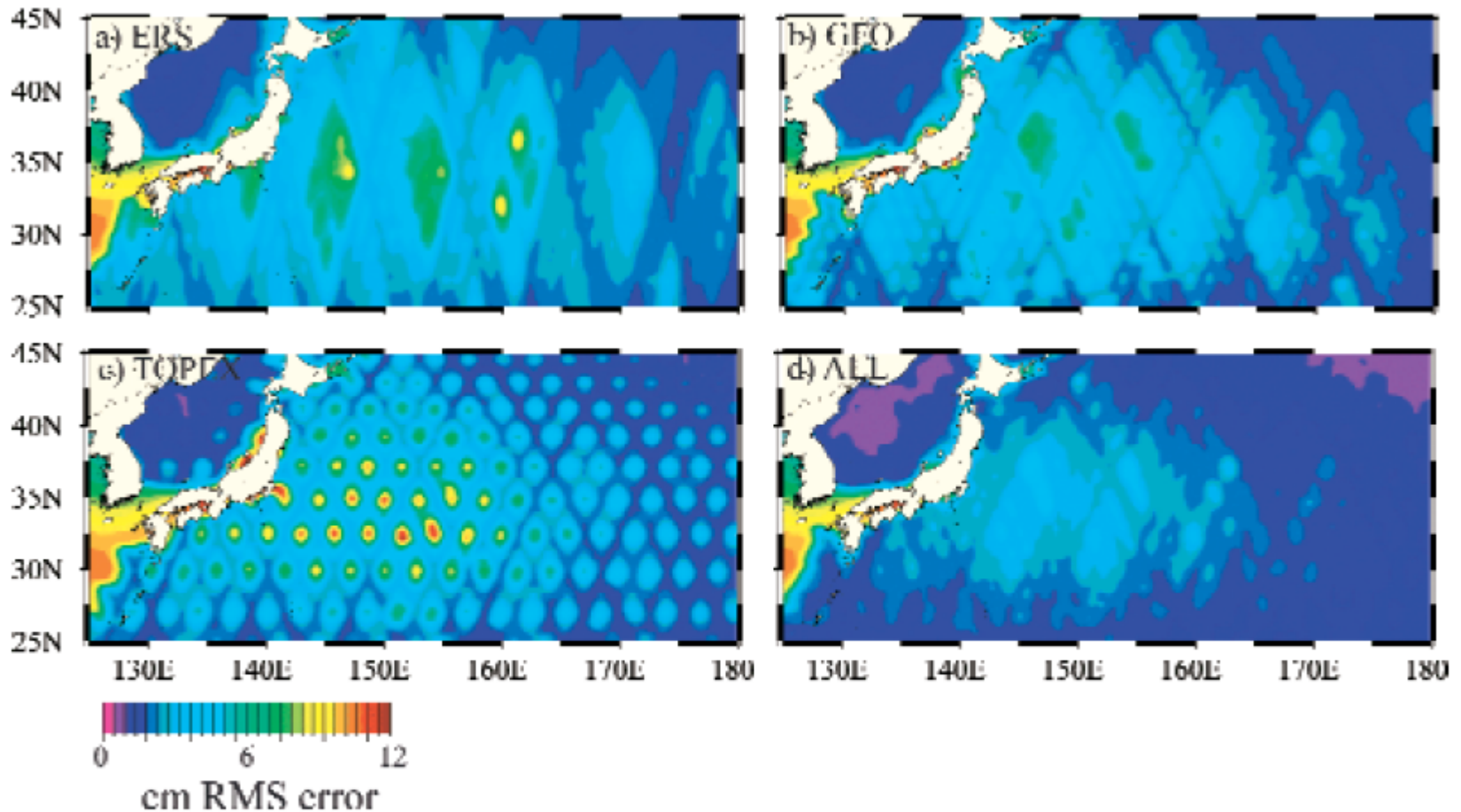


Figure 4. The expected error associated with each interpolation product of Figure 3 shows the sampling capabilities of the measurement systems. The TOPEX errors are due to the large ground track spacing and short temporal sampling. ERS and GFO orbits have a 3 day sub-harmonic that creates the larger diamond patterns.

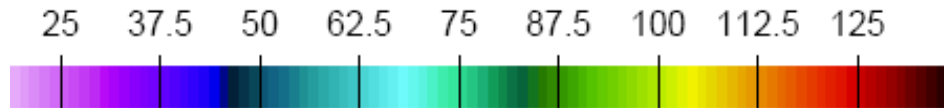
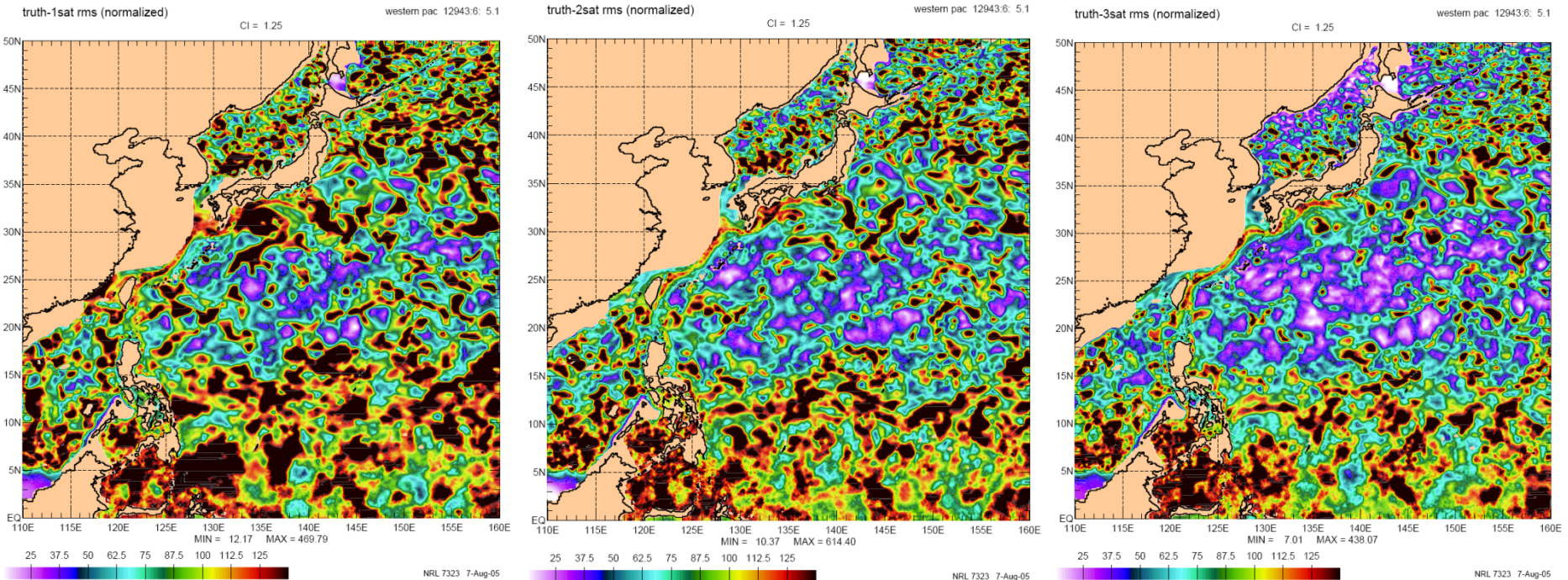
How well do present observations constrain the mesoscale circulation in an eddy representing global model?

The environment estimate error variance (experiment SSH – truth) divided by the truth variance (error to signal ratio)

1ALT

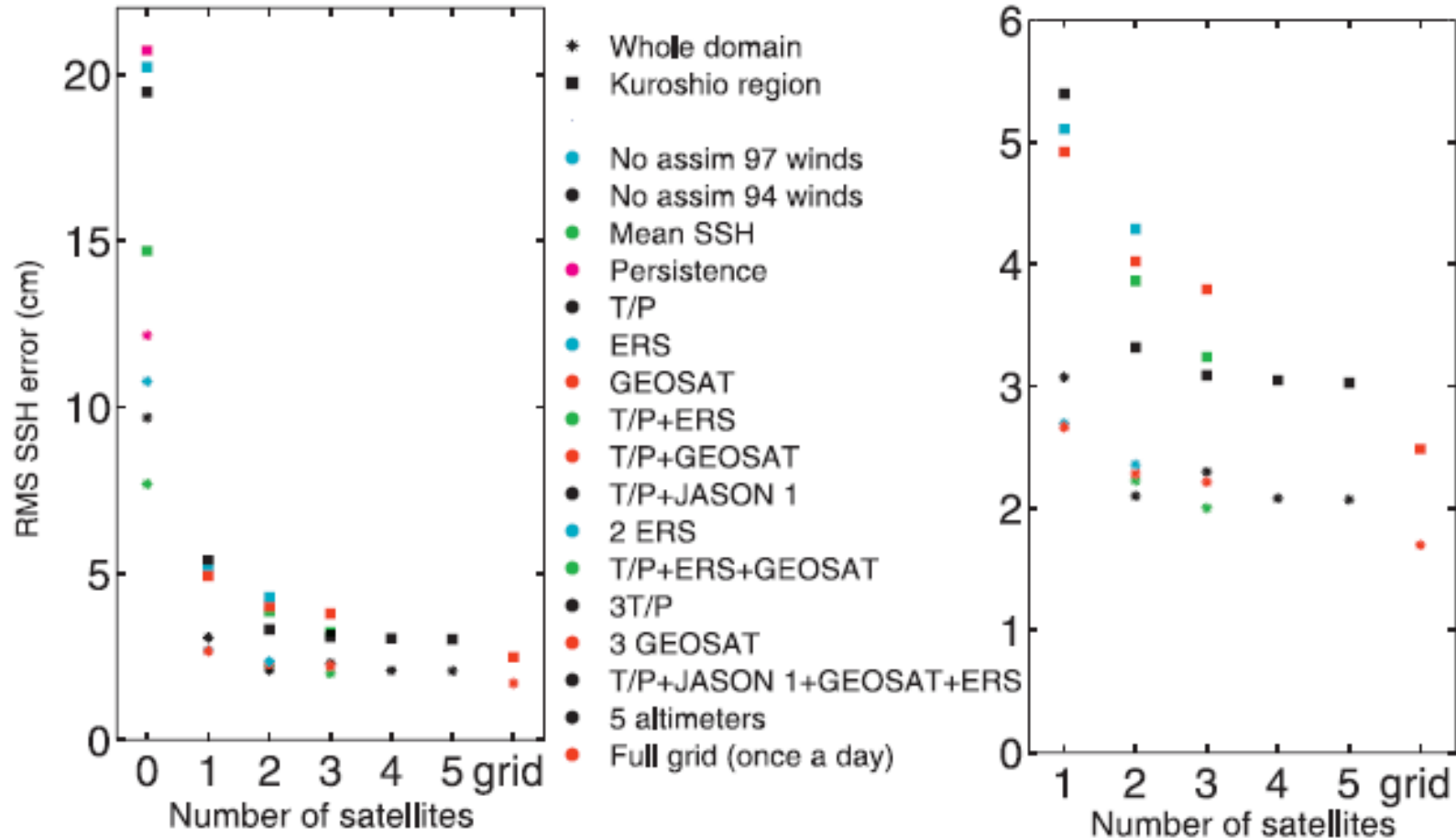
2ALT

3ALT



Percent

RMS Sea Surface Height (SSH) Error vs # of satellite altimeters used in Assimilation of Error Free SSH into the NRL 1/16° Pacific Ocean Model.



Other questions

Mesoscale is one application

Through a case example, how many specific questions have come up

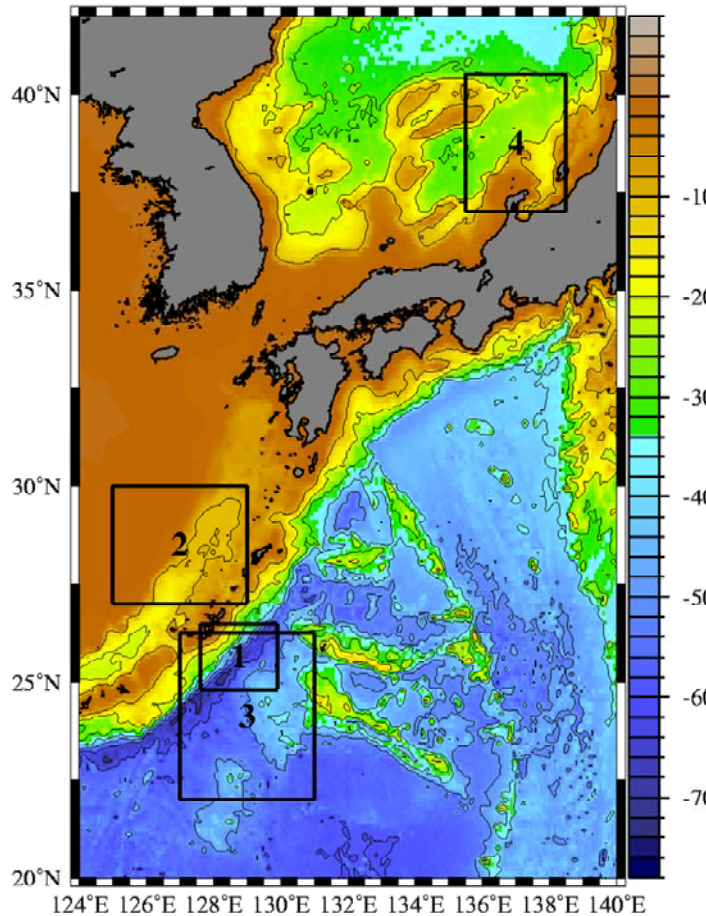
What has been done to address these specific questions:

- Do we need an altimeter
- How many
- GFO was off Oct 2006, what was the operational impact?

Do we need an altimeter

What is the operational impact with data and with use in predictive models?

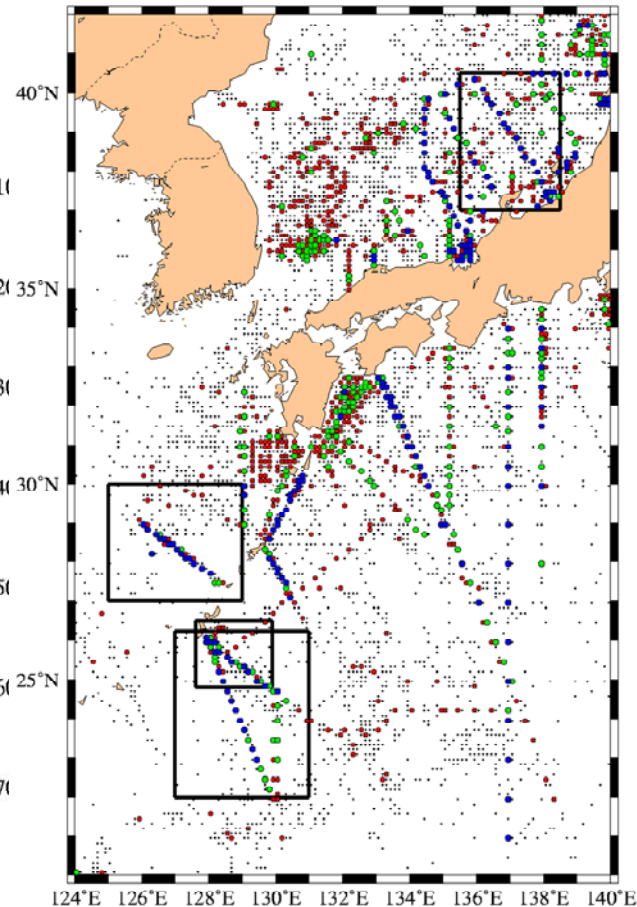
DBDB2 Bathymetry



Naval Research Lab
Stennis Space Center

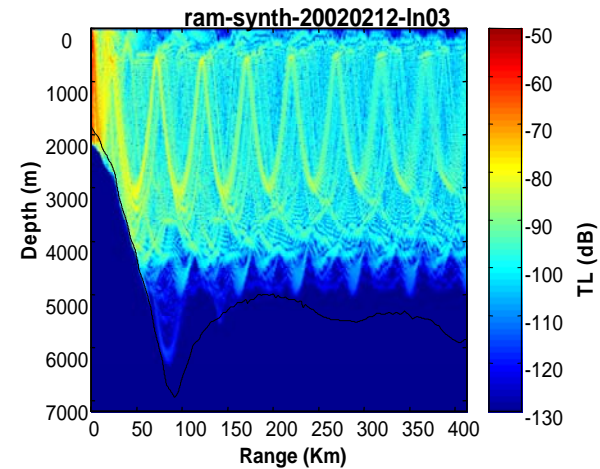
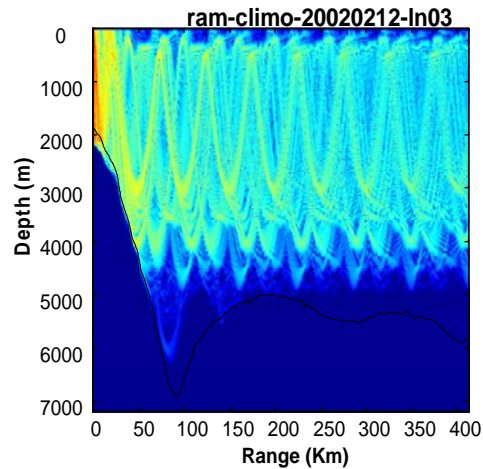
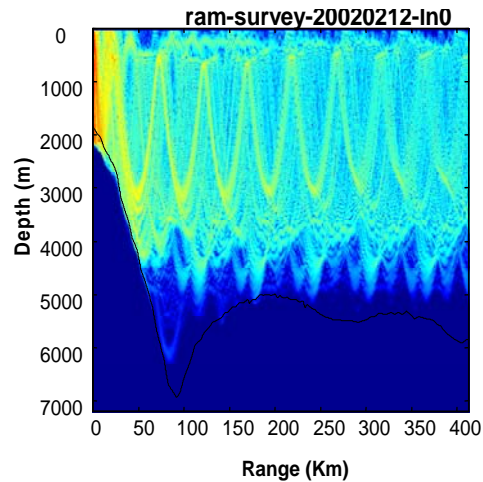
GODAE Profiles 2000-2004

black=1-2 red=3-5 green=6-10 blue=over 10



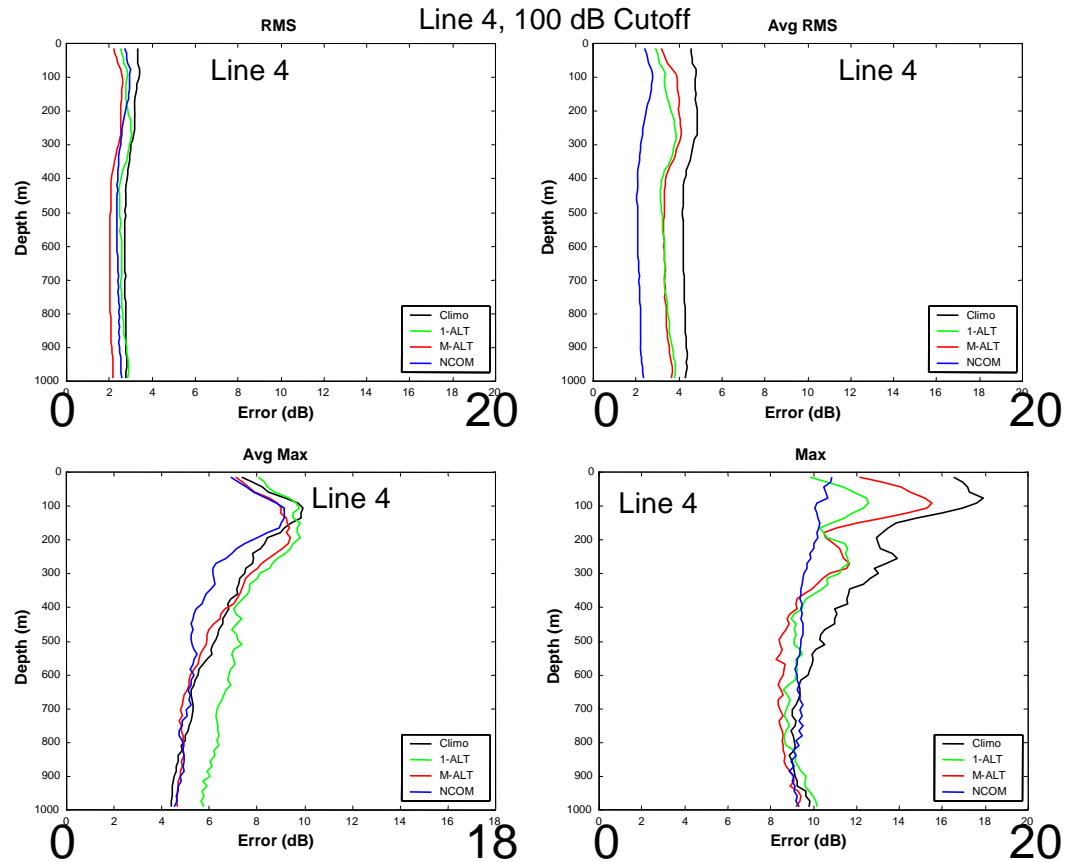
Do we need an altimeter

Impact on acoustic energy



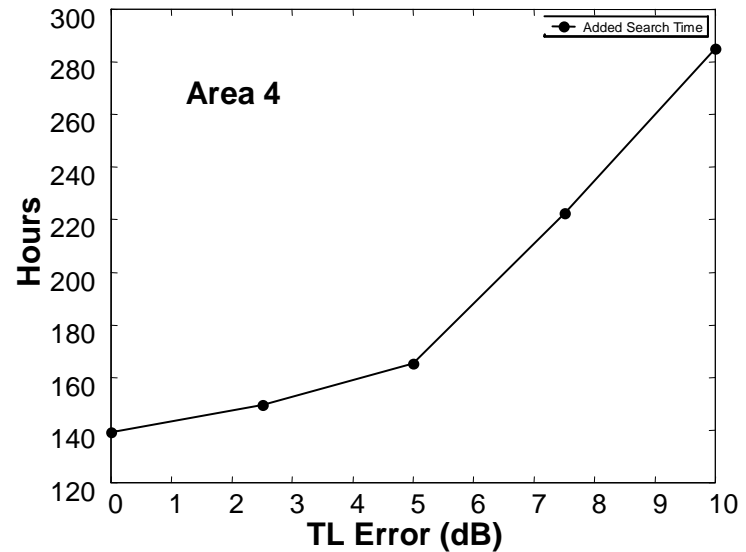
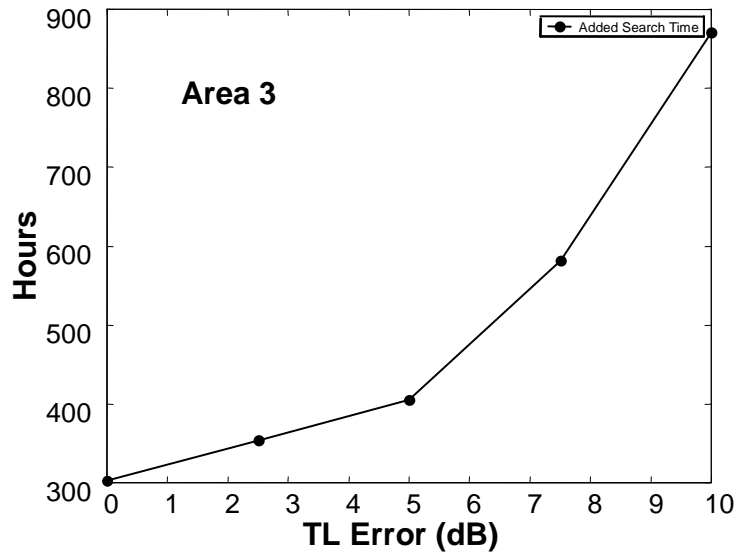
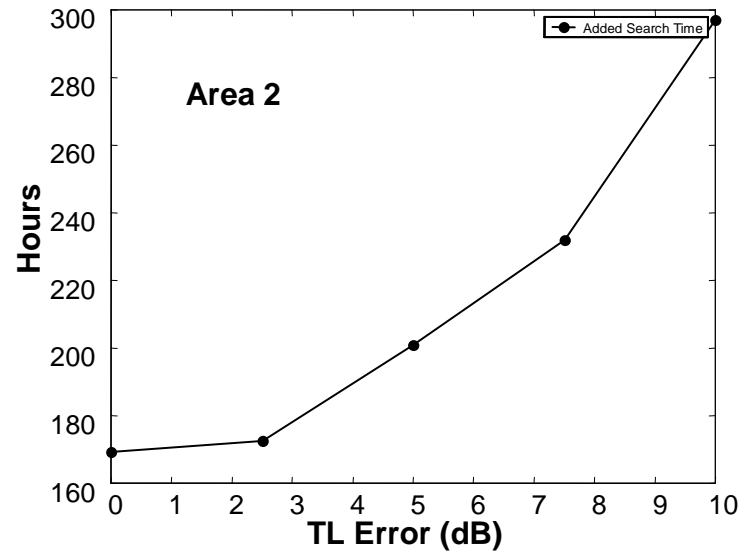
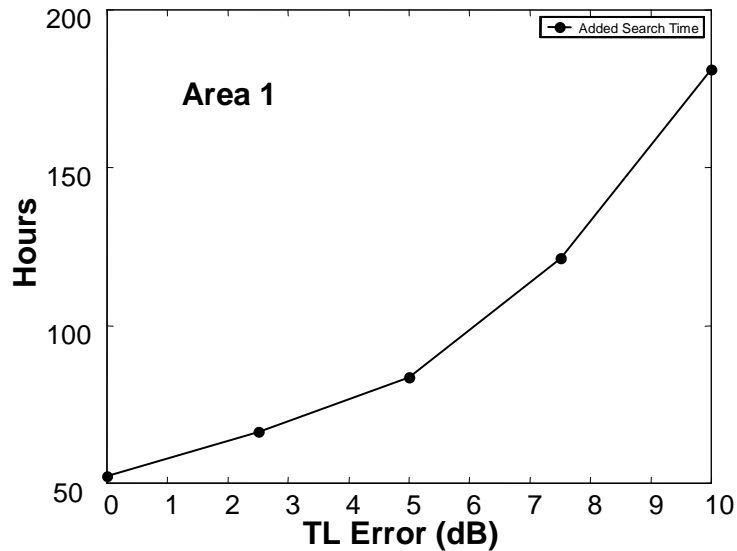
Do we need an altimeter

Acoustic uncertainty on line 4



Do we need an altimeter

Acoustic impact on operations



GFO outage in Oct 2006

NAVSOC efforts for GFO are large, and NAVSOC must prepare for MUOS

COMNAVNETWARCOM asks for “no kidding” impact of GFO outage given Jason-1 and ENVISAT

Hindcast experiments with global 1/32 model

Result: COMNAVNETWARCOM and CNMOC reprogram to cover GFO operational costs for 2008

Conclusion:

Possible phasing options (N) depend on application (science study being done)

There are as several times as many science applications (M) as people at this meeting

The payoff of each possible phase option on each application must be evaluated (NXM studies)

Rigorous evaluation of all NXM studies to optimize scientific payoff as a function of phasing is not possible

General conclusion: maximize the uncorrelated nature of the observations (observe as many different ocean features as possible)