

## The global radiational S1 tide - current Earth rotation research at TU Wien

A. Girdiuk, M. Schindelegger, J. Böhm

TU Wien, Geodesy and Geoinformation, Vienna, Austria

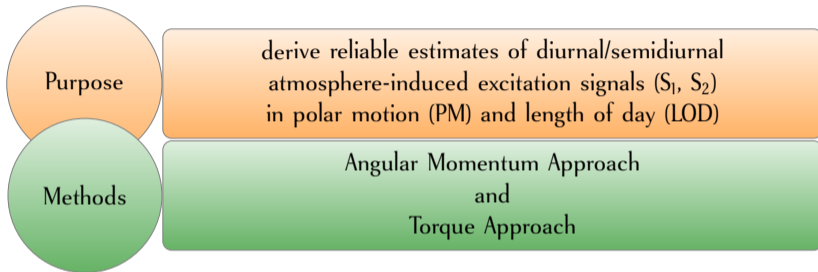
September 17, 2015

# Atmosphere-Induced Short Period Variations of Earth Rotation

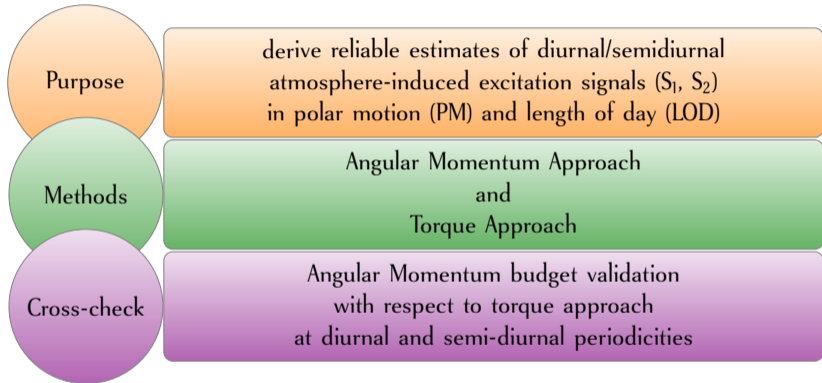
Purpose

derive reliable estimates of diurnal/semidiurnal atmosphere-induced excitation signals ( $S_1$ ,  $S_2$ ) in polar motion (PM) and length of day (LOD)

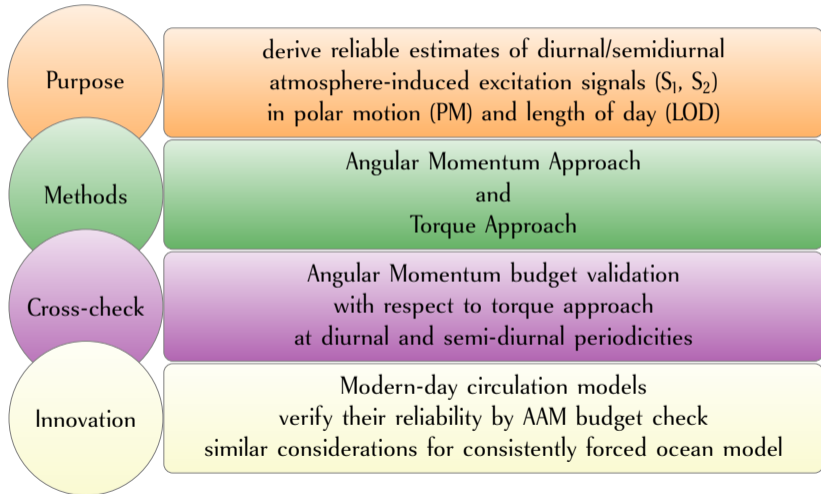
# Atmosphere-Induced Short Period Variations of Earth Rotation



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# ASPIRE

Atmospheric  
Angular Momentum:  
verify by torques  
and AAM budget



FWF

Der Wissenschaftsfonds.



Combined  
geophysical  
excitations

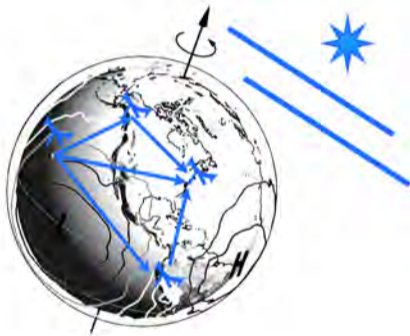
estimation of  
tidal terms from  
VLBI analysis



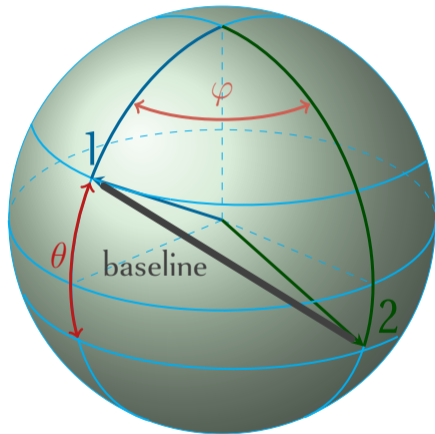
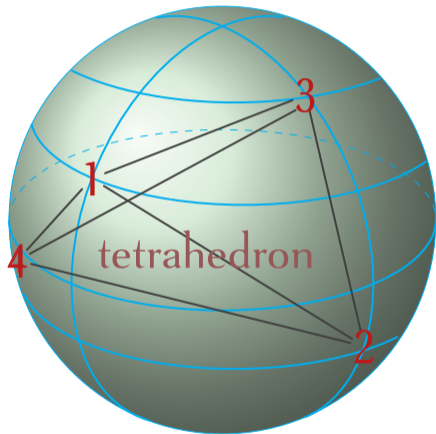
Ocean Model for  
Circulation and Tides



# Combined geophysical excitation: geodetic observations

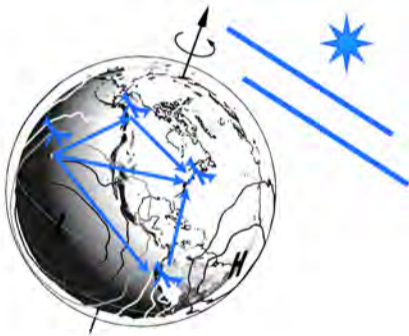


24-hours VLBI sessions





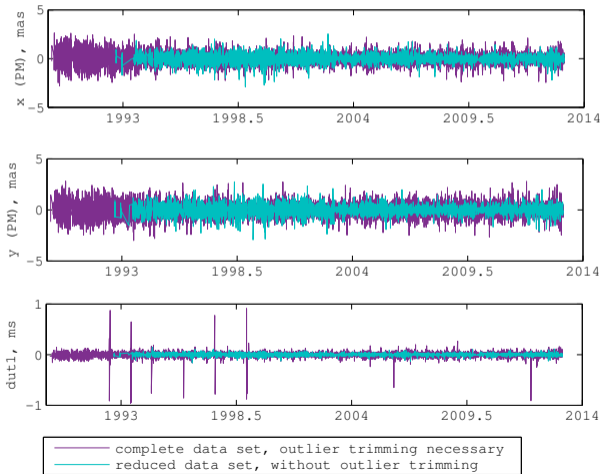
# Geodetic observations: Earth Rotation Parameters (ERP)

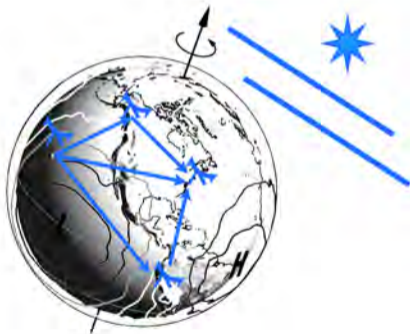


— high-frequency ERP time series

— 24-hours VLBI sessions

# Data set: reduced data set VS. complete data set (selected by network geometry)





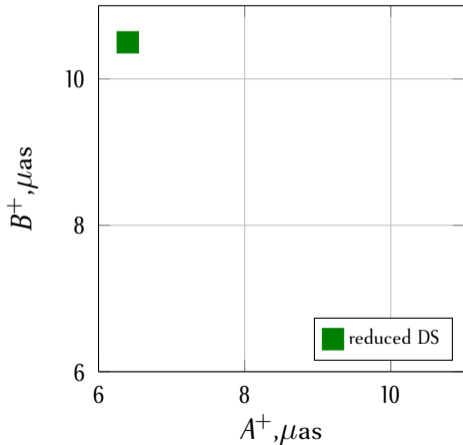
— tidal estimates,  
focus on  $S_1$

— high-frequency ERP time series

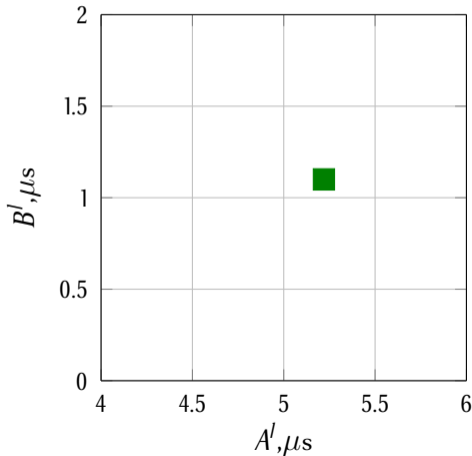
— 24-hours VLBI sessions

# Geodetic observations: estimates of $S_1$ tide

Prograde polar motion

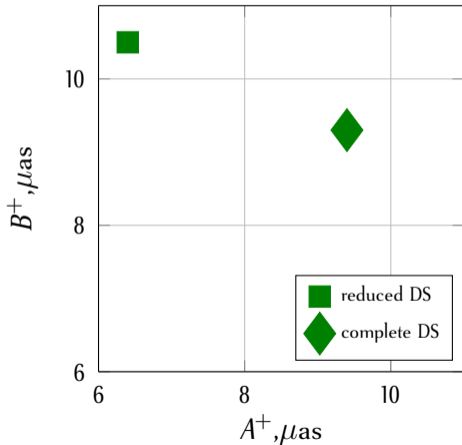


changes in LOD

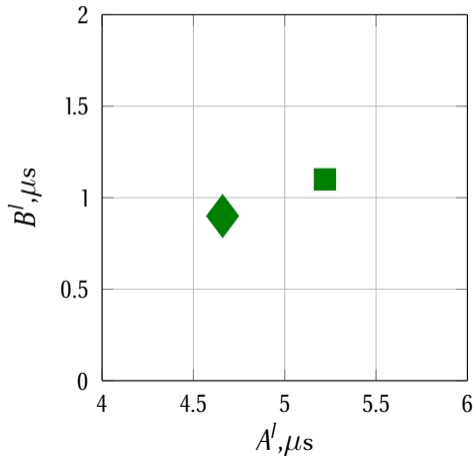


# Geodetic observations: estimates of $S_1$ tide

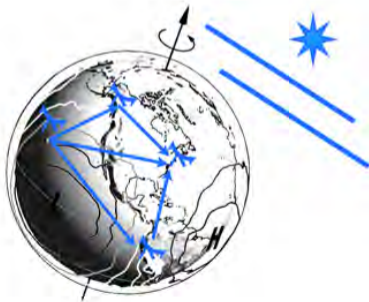
Prograde polar motion



changes in LOD



# Geodetic observations: Earth Rotation Parameters (ERP)



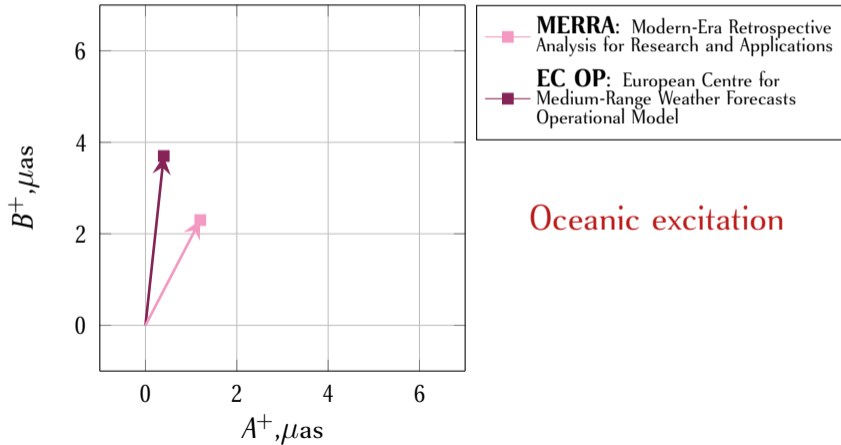
comparison to  
geophysical excitation

tidal estimates,  
focus on  $S_1$

high-frequency ERP time series

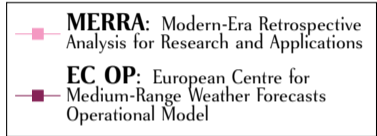
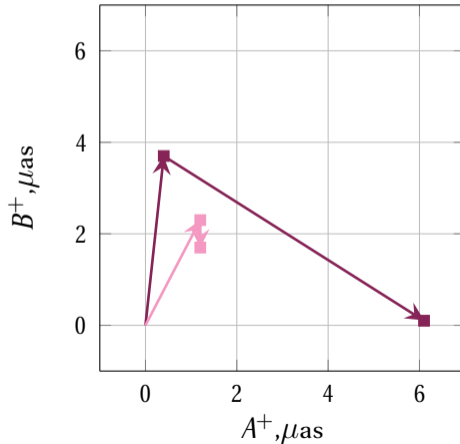
24-hours VLBI sessions

## Prograde polar motion



Oceanic excitation

## Prograde polar motion



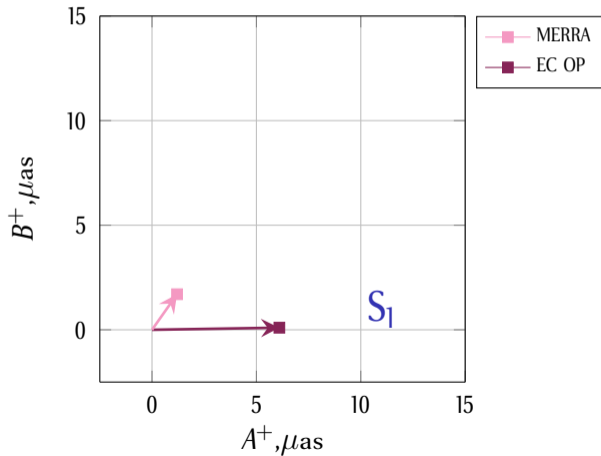
Oceanic excitation

and

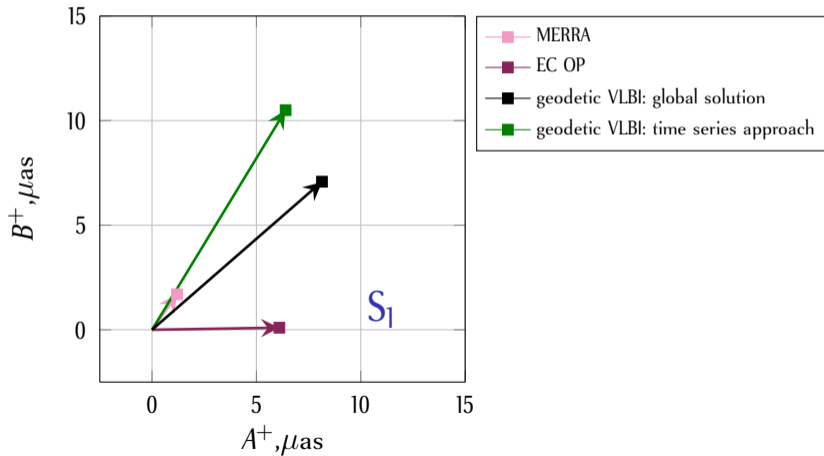
Atmospheric excitation



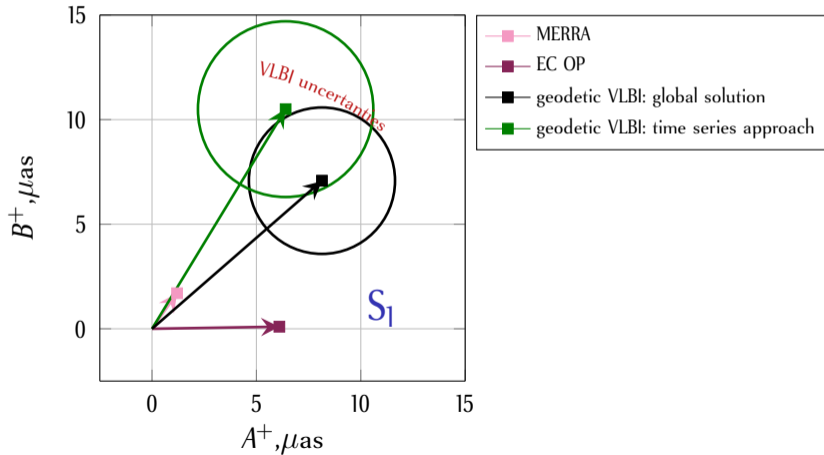
## Prograde polar motion



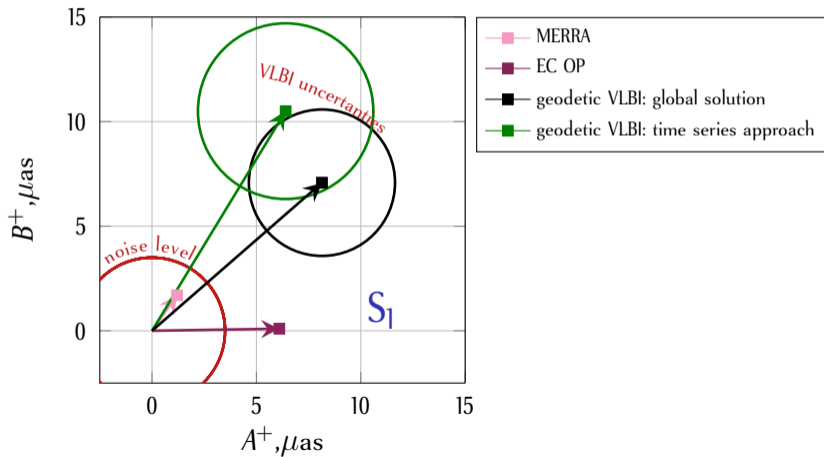
## Prograde polar motion



## Prograde polar motion



## Prograde polar motion



- Upcoming: similar comparisons in LOD;

## Outlook: The global radiational S1 tide – current Earth rotation research at TU Wien

- Upcoming: similar comparisons in LOD;
- The other comparison of atmosphere-ocean contributions to the prograde annual nutation shows a good agreement with geodetic VLBI estimates (both MERRA and EC OP).

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- The other comparison of atmosphere-ocean contributions to the prograde annual nutation shows a good agreement with geodetic VLBI estimates (both MERRA and EC OP).
- We find a reasonably good agreement between published results of other authors (Böhm et al., Artz et al., Gipson et al.) with our time series approach.

Thank you  
for your attention!