

2003 Fall Meeting  
Search Results

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Fall Meet. Suppl., Abstract xxxxx-xx, 2003

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HR: 1330h  
AN: **G22C-0318 INVITED**  
TI: **Fluid Effects on Earth Rotation: What is Next?**  
AU: **\* de Viron, O**  
EM: *o.deviron@oma.be*  
AF: *Royal Observatory of Belgium, Avenue Circulaire, 3, Brussels, 1180 Belgium*  
AU: **Dickey, J O**  
EM: *jean.o.dickey@jpl.nasa.gov*  
AF: *Jet Propulsion Laboratory/Caltech, 4800 Oak Grove Drive, Pasadena, 91109 United States*  
AU: **Dehant, V**  
EM: *v.dehant@oma.be*  
AF: *Royal Observatory of Belgium, Avenue Circulaire, 3, Brussels, 1180 Belgium*  
AB: The interaction between the solid Earth and its fluid layers (the liquid core, the ocean, the hydrology and the atmosphere) is the main cause of Earth rotation fluctuations. Recently, significant progress in atmospheric, oceanic and coupled ocean-atmosphere models has been demonstrated; in parallel, associated data sets and quantity continues to advance. Current and future interdisciplinary geodesy missions (such as Jason, GOCE, GRACE and ICESat) will provide synergistic information that enables unique insights into Earth subsystem processes. Together, joint analyses will result in improvement of fluid models, which will result in better Earth rotation models. In this presentation, we will discuss what we can expect for the future of Earth rotation modeling, and the great challenges ahead.  
DE: 1213 Earth's interior--dynamics (8115, 8120)  
DE: 1223 Ocean/Earth/atmosphere interactions (3339)  
DE: 1239 Rotational variations  
SC: Geodesy [G]  
MN: 2003 Fall Meeting

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**New Search**



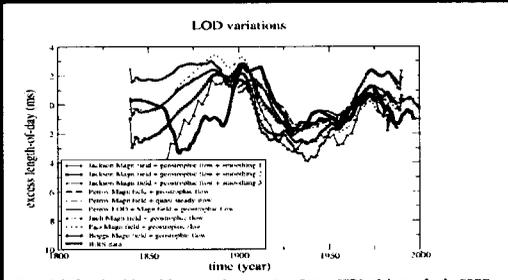


Figure 1: LOD and variation of the core angular momentum. Source: IERS sub-bureau for the CORE

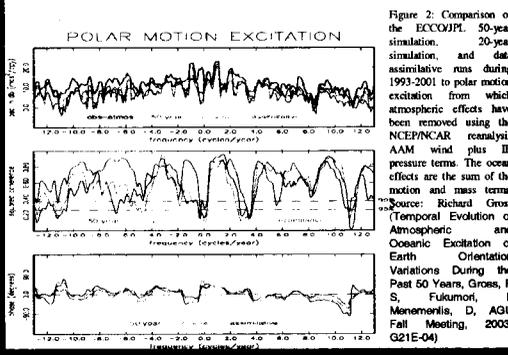


Figure 2: Comparison of the ECCOv2L 50-year simulation, 20-year simulation, and data assimilative runs during 1993-2001 to polar motion excitation from which atmospheric effects have been removed using the NCEP/NCAR reanalysis AAM wind plus IB pressure terms. The ocean effects are the sum of the motion and mass terms. Source: Richard Gross (Temporal Evolution of Atmospheric and Oceanic Excitation of Earth Orientation Variations During the Past 50 Years, Gross, R. S., Fukumori, I., Menemenlis, D., AGU Fall Meeting, 2003, G21E-04)

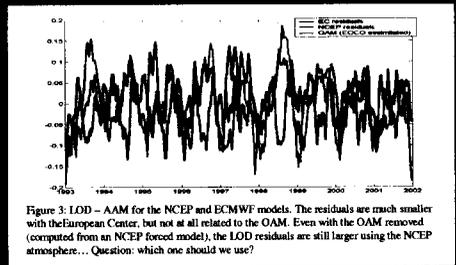


Figure 3: LOD - AAM for the NCEP and ECMWF models. The residuals are much smaller with the European Center, but not at all related to the OAM. Even with the OAM removed (computed from an NCEP forced model), the LOD residuals are still larger using the NCEP atmosphere... Question: which one should we use?

Plate 1. Coherence between the torques from different models

Period (days)	Elipsochil	Mountain	Friction
1-10	X	Y	X Y Z
10-50			
50-100			
100-400			
> 400			

- The three models are coherent
- Two models are coherent
- The models are not coherent

Plate 2. Verification of the AAM budget equation

Period (days)	Wind budget	Elipsochil	Mountain	Friction
1-10	X	Y	Z	X Y Z
10-50				
50-100				
100-400				
> 400				

- The three models conserve AAM
- Two models conserve AAM
- One model conserves AAM
- No model conserves AAM