

Review of: "Connection between the length of day and wind measurements in the meoosphere and lower thermosphere at mid and high latitudes.
by Sven Wilhelm et al. [AnGeo 2018-15, rcvd June 2018]

Relation between zonal wind and length of day variations is a very ambitious topic.

The discussion is very interesting, but I can't find any proof that LOD affects the measured winds.

There are a few points which should be addressed in the introduction.

1. If the earth-atmosphere system were rigid, and the atmosphere expands, the whole system would slow down (become less eastward or more westward) to maintain conservation of angular momentum, But it is not rigid, and since atmospheric drag is the proposed cause of the earth seasonal LOD change, it is important to estimate the time constant. If longer than a season, then maybe no effect on wind would be noticeable. Pg. 8 L 23 mentions the matter, but there is no estimate.

2. If the atmosphere is heated why would expansion be simple and not lead to a different climatology, including winds.

3. The proposed LOD effect depends on heating: the solar cycle radiation variation is surely bigger than the earth-sun distance effect. Does zonal mean wind show a solar cycle variation?

4. It appears that heating to the winter atmosphere should be smaller, even with a closer sun-earth distance, else why is it winter. Why is not atmospheric expansion smaller than in summer?

Fig. 6,7 seem to be showing the full zonal wind vs. LOD. According to an earlier statement, 4 m/s is the estimated contribution from LOD (e.g. Fig. 4), both having annual variations. How does this figure show the LOD-only contribution?

Fig. 8 The long term effect of tides and earth deformation are usually taken to be the cause of slowing the earth's rotation, not atmosphere. How does that physically create a trend in the zonal wind.

Minor typos, grammatical, etc.

Pg 1 L 10 sidereal time
L 11 full rotation , "86400" to make it international.
But 86400s is a mean solar day, not a mean sidereal day,
and LOD was said to based on sidereal time; the difference

is ~ 4 minutes. Some text changes are necessary.

L 13 deceleration ?

Pg 2 L 10 "at solar minimum as well as decrease in the temperature ..." ?

Pg 3 L 22 "its" ?

Pg 4 L 4 "... atmosphere were vertically ..."

L 19 1960s and 70s

L 23 60s

L 24 What is "d" ?

Pg 5 L 6 describe

L 8 "... under the assumption of equal density ..."

L 30 The Aura MLS GPH at 0.001 hPa is virtually always ~90 km

L 32 "density-dependent" ?

Pg 6 L 1 "height and temperature ..", "horizontal grids which are ..."

L 23 ~ 90 km again

L 24 "... in qualitatively good agreement ..."

Pg 7 L 2 Geopotential? or is geometric calculated from geopotential ?

L 9,12 "Gaussian"

L 13 "these results agree with the observations ..." ?

L 15 misplaced "(("

L 31 these , this phenomenon or these phenomena

Pg 8 L 8 explicitly

L 22 relatively

L 34 "solar cycle variation" (there is only one cycle here)

Pg 9 L 14-20 need to be re-written. Meaning is not clear

L 21 "an overall ..."

L 22 "is more ..."

L 33 "stations"

Pg 10 L 10 "can not be figured ..."

L 16 "... at these altitudes. "

Pg 11 L35 "using"

Caption Figure 2, 3: "positive"

