equatorial bulge

Source: http://sci.tech−archive.net/Archive/sci.geo.geology/2005−05/msg00029.html

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- *Date*: Sat, 7 May 2005 12:55:59 +0200

http://geology.ref.ac/marchal/reaction.htm
http://www.mathpages.com/home/kmath182.htm
www.geol.binghamton.edu/faculty/barker/demos/demo10.txt
www−astronomy.mps.ohio−state.edu/~gnewsom/Ast161/jul8.htm
"The spin of the Earth causes the equator to bulge out; without a spin it?s very hard to see why sea level would be so different at the poles vs. the equator. The diameter of the Earth measured through the equator is about 43 km greater than the diameter through the poles. This is called the Earth?s equatorial bulge. The gravity of the moon (and to some extent the sun) pulls on the equatorial bulge. The result is the same for a spinning bicycle wheel held up by a rope attached to the axel. As shown in the class demonstration, the axel of the spinning wheel pivots around like a top (it?s messy math, but Newton?s laws explain it). The bicycle wheel is just like the Earth?s equatorial bulge, and the result is the same: The Earth?s axis wobbles (the technical term is the precession of the Earth?s rotation axis), explaining why the north celestial pole slowly moves compared to the stars. It takes 26,000 years for the Earth?s axis to complete a cycle, so 26,000 years from now Polaris will again be a North Star."
Goldreich et al noted that the magnitude of the bulge was greater than that which would
be expected from a "hydrostatic" earth. This conclusion does not mean that the equatorial bulge is caused by anything other than the rotational forces of the earth (enhanced by lunar forces) just that the physical make up of the earth determines
the magnitude of this effect. IF for instant the earth was solid and rigid there would be
little or no bulge. If the earth was more "plastic" and more hydrodynamic than it is now there would be a greater bulge. But if the earth was not rotating there would be no equatorial bulge at all. Just the "dynamic bulges caused by the gravitational attraction of the sun and moon.

JOL

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- ***Follow−Ups***:

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  - *From:* geraldkelleher

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