TIME, ENERGY AND EARTH CHANGES

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A preliminary relationship has been determined between any anomalies in time that may occur, the associated change in the kinetic energy of the earth, and the projected magnitude of any such changes on a geophysical level. The result of this study indicates that small changes in "time" will manifest themselves as tremendous changes in the energy state of the earth and that they are likely to have a significant geophysical impact. It is therefore valuable to the general public to determine if any abberations in the recording of "time" are indeed occurring, and readers are referred to previous articles entitled Time and Time To Start Watching Time in that pursuit.

The details of this study are mathematical in nature, and are presented below.

The spinning of the earth is one method by which time is recorded. If time (UT based upon the rotational rate of the earth) were to vary in an anomalous fashion, this would also indicate anomalous variations in the rotational rate of the earth. The spinning of the earth also results in a certain level of kinetic energy of the earth. Any changes in time, however small, are reflected in the kinetic energy of the earth. The question here is, what is the change in energy of the earth that occurs with a corresponding change in time that is based upon that same rotation of the earth?

The kinetic energy of any spinning body around an axis is given as (1 / 2) I w^2, where I is the moment of inertia of the body and *w* is the rotational rate of that body[1]. As a first approximation to our problem, let us assume the earth as a homogeneous sphere, where the moment of inertia is (2 / 5) * m * R^2 where m is the mass of the earth in kilograms and R is the radius in meters[2].

Therefore, the kinetic energy resulting from the spin of the earth can be approximated as:

KE_r (approx) = (1 / 2) (2 / 5) * m * R^2 * w^2

The mass of the earth is approximately 5.98E24 kg.[3]

The mean radius of the earth is approximately 6371km.

The rotational rate of the earth, w can be determined approximately as:

***w* (approx.) = (2 * pi) / 86400 radians / second, where 86400 represents the number of seconds in a day of 24 hours, and in this case,**

***w* (approx) = 7.272E-5 rad / sec.**

Therefore, the kinetic energy that results from the spin of the earth can be estimated as:

KE_r (approx) = (1 / 2) (2 / 5) * 5.98E24kg * (6371E3m)2 * (7.272E-5 rad / sec)2

KE_r (approx) = 2.567E29 Joules.

This values agrees extremely well with a tabulated list of energy phenomenon reported by Syracuse University Department of Physics[5], where it is reported the the kinetic energy of the spinning earth is on the order of 10^{29}. This list is valuable to give the reader a sense of scale and magnitude on this problem, and special interest is devoted to the subsection entitled, *Rough Values of the Energies of Various Occurrences*. The range of phenomenon included extends from the creation of the universe to the spinning of the earth to the energy of a

single molecule.

The next question to ask is, what impact would there be upon the kinetic energy of the spinning earth if the rotational rate was decreased by an interval of one second within a unit of time. We can begin the process by assuming a one second change within a time period of one day, and this can be modified appropriately at a later time.

For this problem, we will use the following differential relationship:

$dKE_r / dw = 2 * (1 / 2) * (2 / 5)\ m * R^2 * w$

or

$dKE_r / dw = (2 /5) * m * R^2 * w$

or

$dKE_r = (2 / 5) * m * R^2 * w * dw$

and in this case, we will establish d*w* as the change in rotational rate of the earth caused from a one second change in a 24 hour period, or

d*w* = (1 / 86400) * 7.272E-5 rad / sec

d*w* = 8.417E-10 rad / sec

Therefore, the change in rotational kinetic energy in this case would be

dKE_r **= (2 /5) * m * R2 * w * 8.417E-10 rad / sec**

dKE_r **= 5.943E24 Joules**

Alternatively, if the change of one second were to occur over an interval of one year, we have approximately

dKE_{r365} **= 5.943E24 Joules / 365 days = 1.628E22 Joules / day**

and if the change of one second were to occur over a 45 day period (current examinations in progress), we have approximately

dKE_{r45} **= 5.943E24 Joules / 45 days = 1.318E23 Joules / day.**

The end result of this study is that a one second change in the rotational rate of the earth during the ranges of time under consideration is on the order of 10^{22} to 10^{23} Joules. This exists as a tremendous amount of energy in a transformational state. If we refer to the Syracuse University study above, we find that that the Cretaceous-Tertiary extinction theory metorite is on the order of 10^{23}. We also find that the energy available from the earth's fossil fuels is on the order of 10^{23}.

This study informs us that relatively small changes in the rotational rate of the earth have a potentially great impact upon the energy transformation processes within the earth and earth - celestial system. Even though the change in time may, on the surface, appear to be miniscule in nature, the opposite is in fact true because of the tremendous mass and kinetic energy inherent in the rotating earth.

Readers may also wish to become familiar with a popular science report issued Aug 7 2002 by CNN entitled,

Earth's Waistline Could Be Expanding. A investigative study of earth - mass changes with respect to rotational changes will be discussed in the future based upon the release of this article.

Any revisions or changes will be made to this report as is appropriate.

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References:

1. Dr. M. Fogiel, *Problem Solvers Physics*, (Research and Education Association, 2000), 250.
2. Fogiel, 344.
3. Gordon J. Coleman, The Addison-Wesley Science Handbook, (Addison - Wesley Publishers Limited, 1997), 213.
4. Petr Vanicek, *Geodesy, The Concepts*, (Elvier Science Publishing Co., 1986), 105.
5. *Rough Values of Power of Various Processes*, (http://physics.syr.edu/courses/modules/ENERGY/ENERGY_POLICY/tables.html)

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