BE-31

GLOBAL ATMOSPHERIC ELECTRIC GRADIENT VARIATIONS RELATE TO SURFACE HEAT FLUX

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If naturally occurring bioelectric effects due to atmospheric electric gradients are to be understood more completely, then the process which drives diurnal and seasonal variations of the atmospheric electric gradient should be taken into account. The maintenance of atmospheric electric gradients is, primarily, related to global thunderstorm activity. Yet, the cause of diurnal and seasonal variations of global thunderstorm activity and, consequently, the atmospheric gradient has not been adequately understood.

Solar radiant energy is the source of all biological activity and it combines in a unique manner with global distribution of land and water surface areas to drive the regular diurnal and seasonal variations of the atmospheric electric gradient. Due to what may be termed fortunate circumstances, the global distribution of thermally differentiated surfaces, land and water, is the basis for a surprisingly sinusoidal variation in the amount of thermal energy absorbed by the atmosphere. The amount of available potential and kinetic energy in the atmosphere determines thunderstorm activity and, in turn, the amplitude of atmospheric electric gradient variations. Coincident with variations of the atmospheric electric gradient are variations of naturally occurring Extremely Low Frequency (ELF) electromagnetic energy. The electromagnetic resonant frequency of the earth - ionosphere cavity is eleven Hertz, for an ideally conducting ionosphere. Due to attenuation at the border of the ionosphere, the fundamental resonant frequency is approximately eight Hertz.

An appreciation of atmospheric phenomenological variations should assist others, working with related bioelectromagnetic phenomena.

GLOBAL ATMOSPHERIC ELECTRIC GRADIENT VARIATIONS RELATE TO SURFACE HEAT FLUX

Summary

Hourly changes in the total amount of continental and ocean surface areas exposed to solar radiant energy suggest a strong possibility of correlation with diurnal and seasonal variations of global thunderstorm activity and, indirectly, with variations of the universal atmosphere electric gradient and unitary vertical atmospheric conduction currents. Investigators have long speculated that the underlying cause of diurnal and seasonal variations of global thunderstorm activity is attributed to the distribution of continents and oceans. Utilizing measurements from an ordinary world globe, and accounting for the longitudinal progress of the noon hour sun and the seasonal declination of the sun, a plot of the approximate potential for absorption of solar radiant energy by the earth's surface, differentiated between land and water, was constructed. This plot when compared with diurnal and seasonal variations of global thunderstorm activity and related atmospheric electrical phenomena suggests the existence of a direct correlation. One-half of the earth's surface is always receiving radiant energy from the sun. For purposes of this discussion the earth's surface is differentiated into two catagories, land and water. Approximately 1350 watts per square meter of solar radiant energy, solar constant, reaches the earth's surface. Land absorbs a significant portion of the incident solar radiant energy, the amount depending primarily upon local albedo, moisture content, and the incident angle of irradiation. Water surfaces absorb only about ten percent of the incident solar radiant energy as sensible heat, the remainder of the energy is converted into latent heat of vaporization. Water surfaces exhibit lower albedo than land surfaces.

Investigators of global phenomena such as thunderstorm activity, vertical conduction currents, electric potential gradients and spherics have rationalized a relationship between these phenomena and the rotation of the earth as well as the geographical distribution of continents and oceans. Yet, this relationship has never been detailed beyond general statements an speculations. I have completed a very rudimentary analysis of the hourly potential of solar radiant energy absorption differentiated between global land water surface areas. Graphic results of my analysis are shown in figure (1). The upper curve

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Summary

(A) is a plot of the percentage of total land and water surface areas, weighted as a function of normal component of solar irradiance, verus the longitudinal position of the noon hour sun during the 24 hour period of summer solstice (northern hemisphere). Curve (B) represents both the vernal and autumnal equinoxes. Curve C is representative of the period during winter solstice. Figure (1) shows significant and surprisingly uniform variations of the percentage of global water and land surface areas' solar radiant energy absorption between seasons and during the selected 24 hour periods.

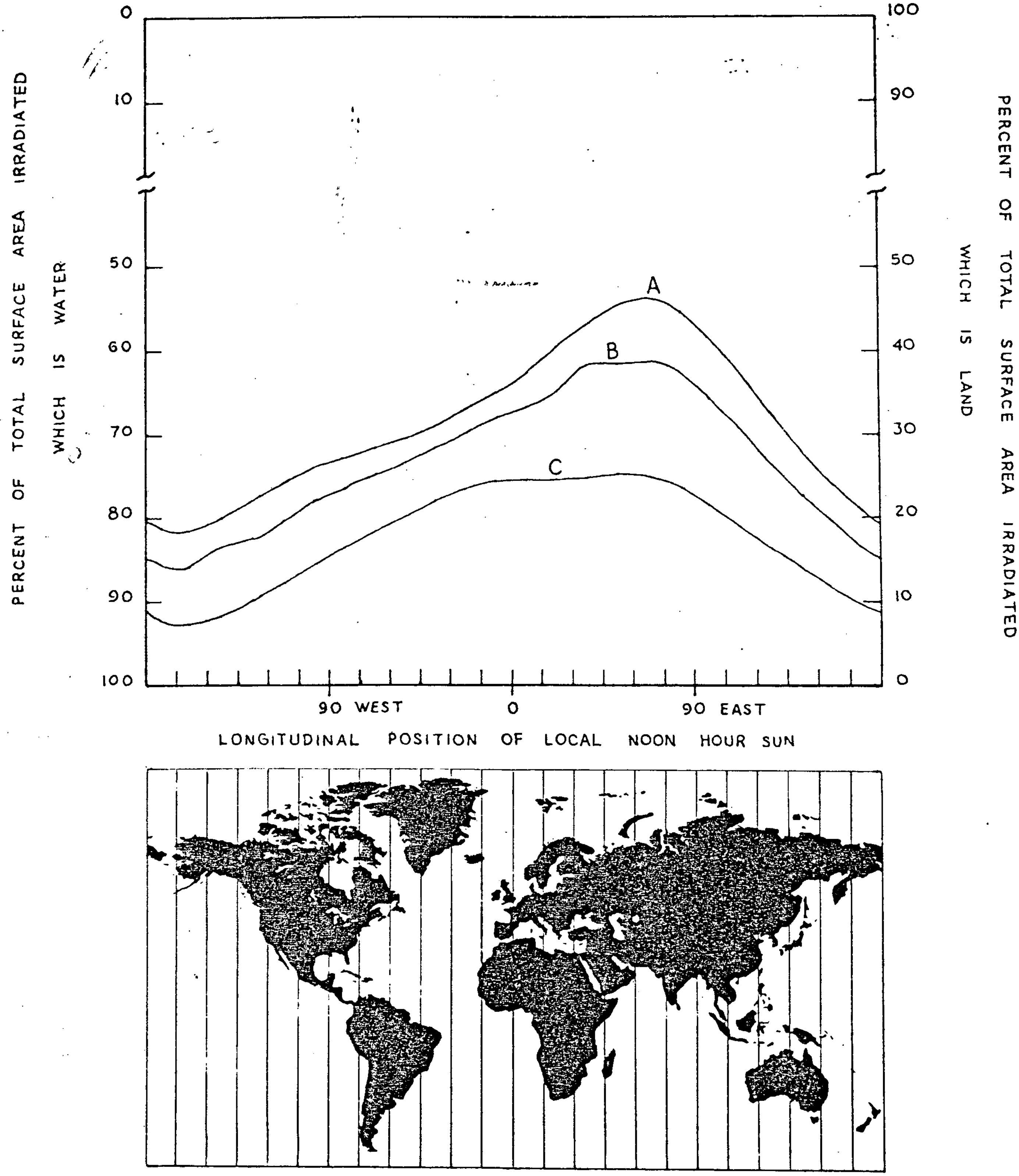

Figure 1

50 mm

Figure 1

Legend

Fig. 1 Percent (weighted) of total surface area irradiated which is water (left) and land (right) versus longitudinal position of noon hour sun. Curve A, summer solstice; Curve B, vernal and autuminal equinoxes; Curve C, winter solstice. All seasons referenced to northern hemisphere. World map is a cylindrical projection, provided for comparison purposes.