Variables unaccounted for in global warming and climate change models

From a personal perspective, Balaram's editorial on 'Carbon dioxide, climate change and geoengineering'[1] resonates at several levels. There is no replacement for wisdom tempered by long experience and deep understanding. His introduction of the subject by describing the activities of Charles Keeling reminds me of lessons learned from my association with Hans Suess in the 1970s, which connect quite strikingly to Balaram's statement,' . . . based entirely on simulations'.

Suess made numerous discoveries of note. For non-exhaustive examples, he co-discovered the shell structure of the atomic nucleus, which won for his colleague, Jensen, a share of the Nobel Prize in physics[2]. In 1957, Revelle and Suess published one of the seminal papers warning of the inability of the oceans to absorb carbon dioxide at the rate being produced, thus leading to the possibility of global warming[3]. Although radiocarbon (^{14}C) dating was the Nobel-Prize winning

discovery of Libby, Suess did much to develop the technique.

Models, also called simulations, are not formulated within the framework of the scientific method, but are built upon assumptions and generally are intended to yield what is being modelled. To paraphrase Box, all models are wrong, a few are useful[4]. Underlying all global warming and climate change models are two fundamental assumptions, namely, that the sun's output is constant and that the energy coming out of the earth is also constant. There are reasons to question the validity of these two assumptions.

One of Suess' activities in developing radiocarbon dating was to radiocarbon-date wood that had been dated by counting tree rings. When Suess plotted absolute (tree-ring) dates against radiocarbon dates, measured in his own laboratory, instead of a straight line, he observed wiggles[5], especially pronounced during the so-called Little Ice Age, ca. 1560–1850. As ^{14}C is produced in the upper atmosphere from solar wind bombardment, to Suess the wiggles meant that the sun's output is not constant and that that variability is reflected in the earth's climate. Solar variability evidenced by 'Suess wiggles' is being confirmed[6].

Models of the earth, based upon the incorrect assumption that the earth in the main is like an ordinary chondrite meteorite, are widespread and have led to the assumption that the heat coming out of the earth is constant. The reason for assumed constancy is that such models are based upon the assumption that the heat exiting earth comes solely from the radioactive decay of long-lived radionuclides, which, on a human timescale, would be essentially constant. But that model of the earth is wrong.

From fundamental considerations, I have shown that the earth in the main is not like an ordinary chondrite, but is instead like an enstatite chondrite[7], which leads to the possibility of the earth having at its centre a nuclear fission reactor[8–10], called the georeactor, as the energy source and operant fluid for generating the geomagnetic field by dynamo action[11]. Unlike the natural decay of long-lived radionuclides, which change only gradually over time, the energy output of the georeactor can be variable[12]. I have also introduced the concept that the earth's dynamics is powered by the energy of protoplanetary compression[13] and suggested a process whereby such energy may be deposited at the base of the crust[14]. There is no reason to assume that the release of stored protoplanetary compression energy would be constant. Such potentially variable energy exiting the earth may contribute not only to variability in the overall heat budget of the earth, but in exiting undersea may affect change to sea-water circulation currents, which may potentially affect the global weather patterns. The degree and extent has not yet been measured[15].

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