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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Mangalajodi wetland: Priority site for conservation

Mangalajodi village with a population of 3088 is located about 5 km from Tangi town in Khurda District, Orissa. It is one of the villages situated along the banks of the Chilika lake and most of its inhabitants are fishermen. Thousands of migratory waterfowls and resident birds visit and breed each year in the wetland marshes of the village. This area is primarily a freshwater zone with marshes, emergent vegetation and reed beds consisting mostly of *Typha angustata* and *Phragmites karka*. This village is connected to the northern sector of the Chilika lake and Kalupada Ghat by way of channels dug through the *Phragmites karka* reed beds. With a length of 1.5 km, the marshes around Mangalajodi, and the open water between Kalupada Ghat and Teenmuhani, attract a large congregation of waterfowls, especially dabbling ducks such as Northern Pintail (*Anas acuta*), Northern Shoveller (*Anas clypeata*), Garganey (*Anas querquedula*) and Brahminy Shelduck (*Tadorna ferruginea*). In addition, the wetland is frequented by Purple Moorhen (*Porphyrio porphyrio*), Asian Openbill Stork (*Anastomus oscitans*), Common Moorhen (*Gallinula coromandelicus*), Grey-headed Lapwing (*Vanellus cinereus*) and many other birds[1]. This site has been recognized as one of India's important bird areas (IBA), which are identified on the basis of a set of internationally accepted criteria. The area is classified under A1 + A4i + A4iii criteria of IBA (A1: the site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern; A4i: the site is known or thought to hold, on a regular basis, ≥ 1% biogeographic population of a congregatory waterbird species; A4iii: the site is known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabirds of one or more species). This is a well-known recognition for the Mangalajodi site after Nalabana Sanctuary of the Chilika Lake and thus further warrants its protection. Spot-billed Pelican (*Pelecanus philippensis*), which is placed in the Near Threatened category of IUCN Red List, is also seen in this site[2].

Poaching is the major threat to the avifauna of Mangalajodi wetland. Poachers are not only killing resident birds but even the migratory birds which visit the site between September and April. They sell them in the nearby markets. Collection of birds' eggs and their sale in the open market is another problem. People cut the *Phargmites* stems and use them for fencing purpose. Due to reed harvesting, the habitats of the waterbirds are diminishing day by day. With efforts from Wild Orissa, a local NGO, some poachers have associated themselves with bird-protection committees to protect birds[3]. Strict vigil is required to conserve the Mangalajodi waterfowl breeding habitat, by local participation in the form of patrolling, educating the masses about bird conservation and their habitat. Use of sail boats should be encouraged rather than motor boats which spill oil from engines and also disturb the environment creating noise. Special care should be taken, providing safety to nesting areas to prevent damage of eggs by cattle and poachers. Well-planned and structured eco-tourism projects should be implemented without hampering the birds' habitat. Alternative livelihood options should be provided by the state government to the villagers, particularly the poachers-turned-conservationists for their sustenance. The Government of Orissa should set up 'participatory management' involving the local community. According to Section 36(c) of the amended Wildlife Protection Act (1972) in 2003, the state government may declare the Mangalajodi site as a Community Reserve. The Community Reserve is nothing but where people volunteer to protect flora, fauna and traditional or cultural conservation values and practices of a certain area rich in biodiversity. However, this area should not be associated with a National Park, Sanctuary or a Reserve. Declaring Mangalajodi as a Community Reserve will not only protect the birds, but also save the wetland from further degradation. If this site is declared a Community Reserve, then it will be the first in Orissa as well as eastern India.

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Rhododendrons in Meghalaya need attention

Meghalaya, the Scotland of the east, is one of the eight states of North East India. The state has 36.8% area under forest cover. It has six types of forest, viz. tropical moist deciduous forest, sal forest, sub-tropical evergreen forest, sub-tropical pine forest and tropical semi-evergreen forest[1]. Rhododendrons form the dominant or associate species in sub-tropical evergreen forest and sub-tropical pine forest, which represent 16.63% of the total forest area. Champion and Seth[2] describe these forests as Khasi sub-tropical wet hill forest and sub-tropical Assam pine forest respectively. Rhododendrons also grow in sacred grooves in the state, which are remnants of relict virgin forests.

Meghalaya is represented by four taxa of rhododendrons, viz. *Rhododendron arboreum* ssp. *arboreum*, *R. arboreum* ssp. *delavayi*, *R. formosum* var. *formosum* and *R. formosum* var. *inaequale*. *R. arboreum* ssp. *arboreum* and ssp. *delavayi* apparently merge into one, as ssp. *Arboreum*[3]. *R. formosum* var. *formosum* is mentioned as endemic to Meghalaya and *R. formosum* var. *inaequale* to North East India and adjacant places[4,5]. However, after thorough investigation by scientists at the Botanical Survey of India (BSI), Eastern Circle (EC), it was found that *R. formosum* var. *formosum* is endemic to North East India and adjacent places, and *R. formosum* var. *inaequale* is endemic to Meghalaya.

A recent Forest Survey of India report shows increase in forest cover in Meghalaya, but it is still a controversy. With the shrinkage of green cover everywhere, rhododendrons are also facing the impact of a disturbed ecological system. Major threats to rhododendrons in Meghalaya are the expansion of agricultural activities in the forest, over-exploitation of forests for firewood, expansion of animal farming land and extensive collection of flowers. Besides these, natural calamities such as landslides and forest fires also affect the rich growth of rhododendrons.

Local people of Meghalaya have been preserving *R. arboreum* from time immemorial, through the taboos associated with it. The Khasi people believe that if these plants are uprooted from their natural habitats and grown in one's courtyard, it would certainly bring bad luck to the household. However, it is used as firewood and for making smoking pipes, and its leaves and flowers are used in the treatment of various ailments. While *R. formosum* with no taboos associated with it is extensively collected for its beautiful flowers by the locals, it is often uprooted from its natural habitat and planted in home gardens, where 90% of the plants fail to survive. While uprooting, the root system is damaged beyond repair as well as its mycorrhizal association (like other Ericaceae, rhododendrons have mycorrhizal association). These plants need enormous supply of water at their initial stage of their growth. They also need lot of humus for their proper growth. The uprooted plants from natural habitats are often found sold at the roadsides by the Khasi folks at Rs 50–100 per plant during the flowering seasons, i.e. March and April. Though there are certain laws preventing such acts, no law is well enforced to stop this menace.

R. arboretum ssp. *arboreum*.