Don't be Gored into going along

Climate change is again making headlines as the world becomes mesmerised in the public relations glare of Al Gore's movie 'An Inconvenient Truth'. For critics and reviewers alike, the movie is further proof in their minds that we are heading for a climate catastrophe. But what's missing from the debate is sober, rational analysis of some scientific facts.

Climate change attracts attention because weather and climate extremes account for 70% of natural disasters. Also, the historical evidence is that climate goes through gyrations that are beneficial or destructive for civilisations.

The periods of the Roman Empire, medieval Europe and the past 200 years were all of remarkable warmth. The Dark Ages of the first millennium and the little Ice Age of the second were characterised by cold, by advanced mountain glaciers and by social turmoil.

For the past 10,000 years, the Earth has been near peak warmth in a climate roller-coaster that has characterised the past million years. Yet only 20,000 years ago, great ice sheets covered much of North America and Europe; permanent glaciers were also present over south eastern Australia and Tasmania. The sea level was 130m lower than today and land bridges connected New Guinea and Tasmania with the Australian mainland. The Great Barrier Reef was but limestone cliffs bordering the Coral Sea.

The former US vice president and his fellow travellers would have us believe that the actions of our civilisation are leading to dangerous climate change, as if climate is not inherently dangerous. There are many inconvenient truths about climate that are being ignored in the scare campaign that is being waged with relentless determination by sections of the community.

Start with carbon dioxide. As a greenhouse gas, it is a spent force for climate change; its present concentration is slightly less that 400 parts per million. Calculations show that 66% of the greenhouse effect of CO_2 is caused by the first 50ppm. With each doubling of concentration (from 50 to 100, then to 200 and 400ppm), the incremental advance of the greenhouse effect is reduced.

Even for a further doubling to 800ppm, as projected by 2100 in the case of unabated fossil fuel usage, the increase in the greenhouse effect will only be 10% of the present component attributable to CO_2. Overall, CO_2 is a relatively minor contributor to the greenhouse effect, which is dominated by the varying water vapour and clouds of the atmosphere.

Increasing the CO_2 concentration will have little additional effect. Evaporation of water vapour will constrain the Earth's temperature and prevent runaway greenhouse effect. Back radiation from the atmosphere because of greenhouse gases (water vapour, CO_2 and so on), clouds and aerosols raises surface temperature. But surface temperatures are also constrained by evaporation of water from plants, moist soil and the oceans. The tropical oceans generally do not exceed 30°C and it is only over the arid inland that daytime temperatures exceed 40°C. Any increase in back radiation because of increased CO_2 will largely be offset by additional evaporation that will constrain the rise of surface temperature.

The oceans are the flywheels of the climate system. The warm tropical oceans are a thin lens about 100m in thickness that overlay the cold abyss, extending to depths averaging about 5km. We are familiar with El Nino events, when changed upwelling modifies the entrainment of cold sob-surface water into the warm surface layer of the equatorial Pacific Ocean. As US climatologist Michael Glantz has noted, the changed surface temperature patterns modify the atmospheric circulation and spawn natural disasters such as floods, droughts and storms across the globe.

Global warming is constrained by the need to warm the ocean in advance. The polar ice sheets of Greenland and Antarctica are fundamentally stable. Ice cores recovered from there confirm that the ice sheets have survived previous interglacial and have likely existed for more than one million years. The surface elevations of the ice sheets is more than 3km above sea level across much of their extensive plateaus and temperatures remain below -10°C during the brief summer. It is only at the lower elevations of the coastal margins that temperatures rise above freezing for a few months and the strong solar radiation causes ice-melt.

Collapse of the polar ice sheets and a sea level rise of several metres is an unlikely scenario. Scientists' continuing inability to predict with confidence a season in advance should be cause for hesitation when projections of decades or centuries are made. Computer models are not reality and alarmist predictions have no sound basis. ■

William Kininmonth, Australia

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