

Less Well-Known Aspects of Climate Change

In last week's column I tried, with the help of David Attenborough, to explain the fundamentals of climate change, how it happens, and what are the most obvious effects on our lives. It turns out, there are effects that are quite serious, but not obvious to those of us in the Hill Country.

Many such effects are most notable in the polar regions of the planet, especially Arctica, Greenland and Island. The extent of annual world-wide global warming is only something like 1.5 deg C. which might not sound like all that much. We live with daily local outside temperature variation 10 times that and more all the time. But it is not the daily local temperature variation that has its effects on the arctic, but the annual, world-wide temperature.

So, while those of us in the Hill Country hardly notice year-to-year temperature variation, that 1.5 deg C increase is melting glaciers, icebergs, snow cover, etc. all over the arctic. It was only recently that for the first time in our lives, there was an ice-free path around the arctic. Much of the Iceland and Greenland glaciers are melting and the depth of snow cover is decreasing. The polar bear is now listed as threatened or endangered because of too little floating ice and too much open water for them to capture seals.

In fact, it is not really just the Arctic, but huge chunks of ice are breaking off the Antarctic ice sheet and becoming huge country-sized icebergs.

We can't say that all that melting is not affecting the rest of the Earth, because when it all melts, it adds to the volume of the ocean, sea level rises, and threatens to flood low-lying communities. Louisiana has already lost a significant amount of land area.

It is not just that the warmer atmosphere affects the arctic as discussed above, but it also exacerbates the warming of the Earth because when areas of the sea or land that would normally be snow-covered has lost the snow, the darker-colored land or sea adsorbs more of the sun's rays, thus increasing the temperature of land and the sea which adds to the global temperature.

There is also, however, an even greater effect when the tundra (a vast, flat, treeless Arctic region of Europe, Asia, and North America in which the subsoil is permanently frozen) receives direct sunlight because of no snow cover. The direct heating of the tundra causes it to begin to melt, and this then releases methane which has been trapped for centuries just below the surface. Methane is a gas and its release just adds to the carbon content of the atmosphere, and, as a greenhouse gas it is even worse than carbon dioxide..

So, in summary, it may seem like the polar regions are far from the Hill Country, but what goes on there has world-wide consequences on the overall temperature of the Earth. But in addition to what goes on in the polar regions, we have all heard the

predictions that as the warming gets worse, it is likely to cause more storms, especially hurricanes, as well as disruption of normal weather patterns, increased rainfall for some areas and less for others.

If you remember the global numbers I discussed in previous columns, the amount of wilderness area, world-wide, is only about half of what it was back in 1937, which had already been reduced by a third since pre-industrial times. Why is this important?

In a healthy, functioning wilderness area, a lot of photosynthesis goes on, which means the capture of carbon dioxide from the air and converting it into plant tissues such as carbohydrates. When this occurs in long-lived plants such as trees, that carbon dioxide is locked up in the tree for decades and even centuries. But since mankind has so greatly reduced the amount of wilderness area, we have lost the good effect of dense forests taking carbon out of the air.

In addition, we know that the amount of climate change that has already occurred affects weather patterns, including droughts and hurricanes. The destruction of hurricanes with increased intensity has also been clear to all of us.

The secondary effects of droughts are most evident in record-breaking forest fires in both the US west coast and in Australia. I don't hear any predictions that the effects of climate change are likely to become less severe.

There are more things humans do that accelerate climate change to be discussed in a future column.

Until next time...

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