

Subject: ClimateTruth No 195
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**NZCLIMATE TRUTH NO 195
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OCEAN ACIDIFICATION

"Climate Change 2007" has a new Chapter, No 7, not present in previous Reports entitled

"Couplings Between Changes in the Climate System and Biogeochemistry"

The main purpose of this Chapter is to try and promote the idea that additional carbon dioxide will increase the acidity of the ocean to a dangerous degree. Since the globe is evidently not warming, the supporters of the greenhouse theory are having to abandon the slogan of global warming, so they are now trying to substitute acidification of the ocean as a reason for restricting emissions of carbon dioxide.

As with all of the material in the IPCC Reports Chapter 7 does not actually provide the evidence for possible dangerous ocean acidification.

The argument that the ocean is becoming more acidic is based on the use of a parameter called the "Revelle Factor" established by Roger Revelle, a founder of the CO₂ measurements at Mauna Loa. According to

<http://tinyurl.com/6pg2dy>

This factor is defined as follows

"The ratio of the instantaneous fractional change in the partial pressure of CO₂ (pCO₂) exerted by seawater to the fractional change in total CO₂ dissolved in the ocean waters. The buffer factor relates the partial pressure of CO₂ in the ocean to the total ocean CO₂ concentration at constant temperature, alkalinity and salinity. The **Revelle factor** is a useful parameter for examining the distribution of CO₂ between the atmosphere and the ocean, and measures in part the amount of CO₂ that can be dissolved in the mixed surface layer."

The relevant part of page 531 of "Climate Change 2007" is as follows:

7.3.4.2 Carbon Cycle Feedbacks to Changes in Atmospheric Carbon Dioxide

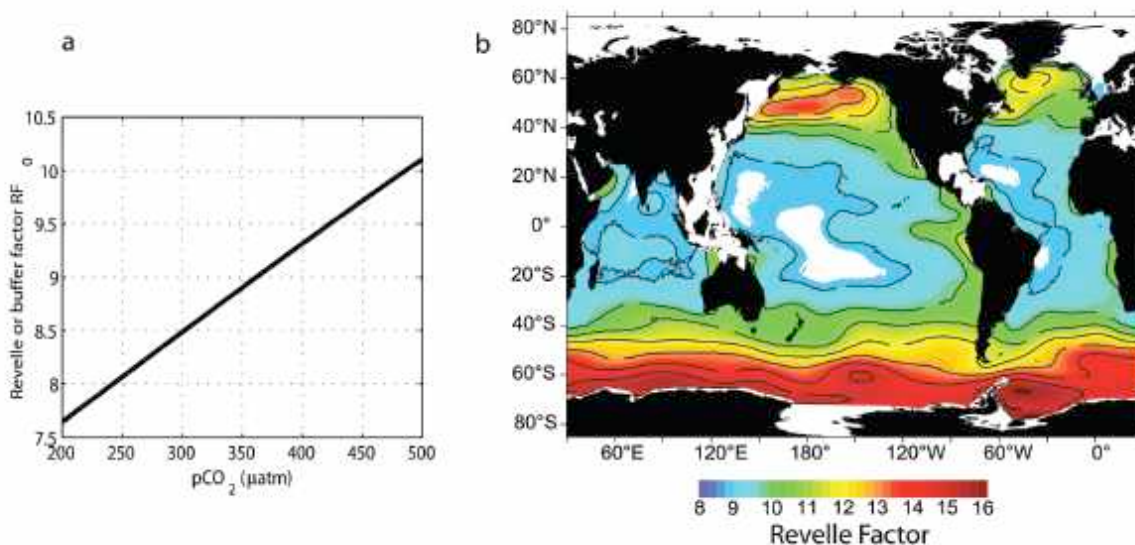
Chemical buffering of anthropogenic CO₂ is the quantitatively most important oceanic process acting as a carbon sink. Carbon dioxide entering the ocean is buffered due to scavenging by the CO₃²⁻ ions and conversion to HCO₃⁻, that is, the resulting increase in gaseous seawater CO₂ concentration is smaller than the amount of CO₂ added per unit of seawater volume. Carbon dioxide buffering in seawater is quantified by the Revelle factor ('buffer factor', Equation (7.3)), relating the fractional change in seawater pCO₂ to the fractional change in total DIC after re-equilibration (Revelle and Suess, 1957; Zeebe and Wolf-Gladrow, 2001):

$$\text{Revelle factor (or buffer factor)} = (\Delta[\text{CO}_2] / [\text{CO}_2]) / (\Delta[\text{DIC}] / [\text{DIC}]) \quad (7.3)$$

The lower the Revelle factor, the larger the buffer capacity of seawater. Variability of the buffer factor in the ocean depends mainly on changes in pCO₂ and the ratio of DIC to total alkalinity. In the present-day ocean, the buffer factor varies between 8 and 13 (Sabine et al., 2004a; Figure 7.11). With respect to atmospheric pCO₂ alone, the inorganic carbon system of the ocean reacts in two ways: (1) seawater re-equilibrates, buffering a significant amount of CO₂ from the atmosphere depending on the water volume exposed to equilibration; and (2) the Revelle factor increases with pCO₂ (positive feedback; Figure 7.11). Both processes are quantitatively important. While the first is generally considered as a system response, the latter is a feedback process.

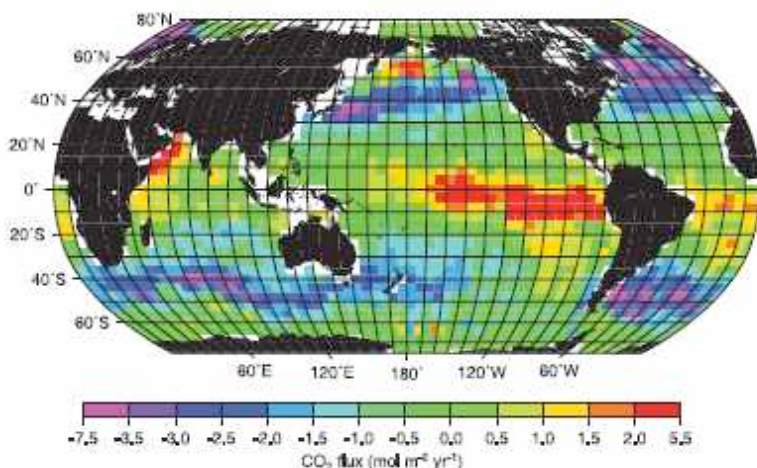
The ocean will become less alkaline (seawater pH will decrease) due to CO₂ uptake from the atmosphere (see Box 7.3).

There then follows the following graph:



which demolishes their whole argument. Activists try to pretend that the ocean is uniform and that its pH is the same everywhere. It is obvious from this graph that the Revelle factor varies enormously from one part of the ocean to another, and has probably done so for millions of years. Nobody has ever claimed that the organisms living in the regions with a high factor are suffering or dying. One presumes they have adapted and like it there. Currently the high Revelle factor is associated with the Southern ocean, so that is the place where "scientists" are trying to prove that all the marine organisms are "under stress", but they fail to tell us that they have been putting up with it for a very long time. A slight expansion of the red area of the Southern ocean is the only possible consequence of large increases in the carbon dioxide content of the atmosphere.

The point may be emphasized by another graph from "Climate Change 2007



This is from page 523. It shows the CO₂ flux in the ocean. Again, it is highly variable. There are several regions, in temperate zones, where carbon dioxide is being discharged from the oceans. Presumably the water is already saturated with CO₂ and is unlikely to be affected by any increases in the atmospheric concentration. There is only one region, just off South America where there is a serious CO₂ deprivation, which is below the pH enjoyed by its neighbours and the occupants might welcome a bit of topping up.

To conclude: the ocean acidification scam is based on the delusion that the ocean is uniform. Its

current acidity is highly variable, and always has been. There are bound to be a wide range of marine organisms which will continue to cope with whatever variability is in store.

Cheers

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"The desire to save humanity is
always a false front for the urge to rule it"
H L Mencken