This is the print version of the Skeptical Science article 'CO2 is coming from the ocean', which can be found at http://sks.to/oceanco2.

Oceans are acidifying from absorbed CO2

What The Science Says:
Measurements of carbon isotopes and falling oxygen in the atmosphere show that rising carbon dioxide is due to the burning of fossil fuels and cannot be coming from the ocean.

Climate Myth: CO2 is coming from the ocean
"The solubility of carbon dioxide in water is listed in the Handbook of Chemistry and Physics as a declining function of temperature. ... The rising values of atmospheric carbon dioxide during the time of the Mouna Loa measurements could clearly be a function of reduced solubility of CO2 in the oceans of the Planet." (Watts Up With That)

We can be confident the extra CO_2 in the atmosphere has come from the oxidation of fossil fuels and not from outgassing from the ocean or from soil/land sources by using two key observations.

1. Oxygen decrease

Atmospheric oxygen is going down by the same amount as atmospheric CO_2 is going up. Oxygen is so abundant at about 21% (209,500 ppm) that we are in no danger of running out; the change in oxygen simply shows that whatever the source of CO_2 in the atmosphere, the carbon part of it has come from the oxidation of reduced carbon compounds and the oxygen has come from oxygen gas in the atmosphere. That is, the extra CO2 was not released in the form of CO_2 from an unknown source but instead some reduced carbon compound was burnt in the atmosphere to produce CO_2. See: AR3WG1 Section 3.5.1, especially Figure 3.4.

2. Known fossil fuel CO2 emissions

Most obviously, any alternative explanation for the source of the CO_2 in the atmosphere has to also come up with where the 30 billion tonnes of CO_2 known to be released by fossil fuel burning each year goes.

Atmospheric CO_2 is currently increasing at about 2 ppmv per year (or 16 billion tonnes). That is, only around half of the CO2 we release remains in the atmosphere. The pH decrease in the oceans corresponds to most of the “missing” CO_2, so we can also be confident that land use changes etc are not a major source/sink. Caveat: Land use and biomass changes certainly soak up a lot of CO_2, some it simply regrowth of forests etc, but the point is that the increasing CO_2 in the atmosphere clearly demonstrates that they do not soak up enough.

In summary:

Amount of increased CO2 in the atmosphere	+	Amount of increased CO2 in the oceans	=	Amount of known fossil fuel emissions of CO2

Acknowledgements: this post was written by New Zealand chemical oceanographer, Doug Mackie.

Update July 2015:

Here is a related lecture-video from Denial101x - Making Sense of Climate Science Denial

[*see video at* ***this link***.]

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