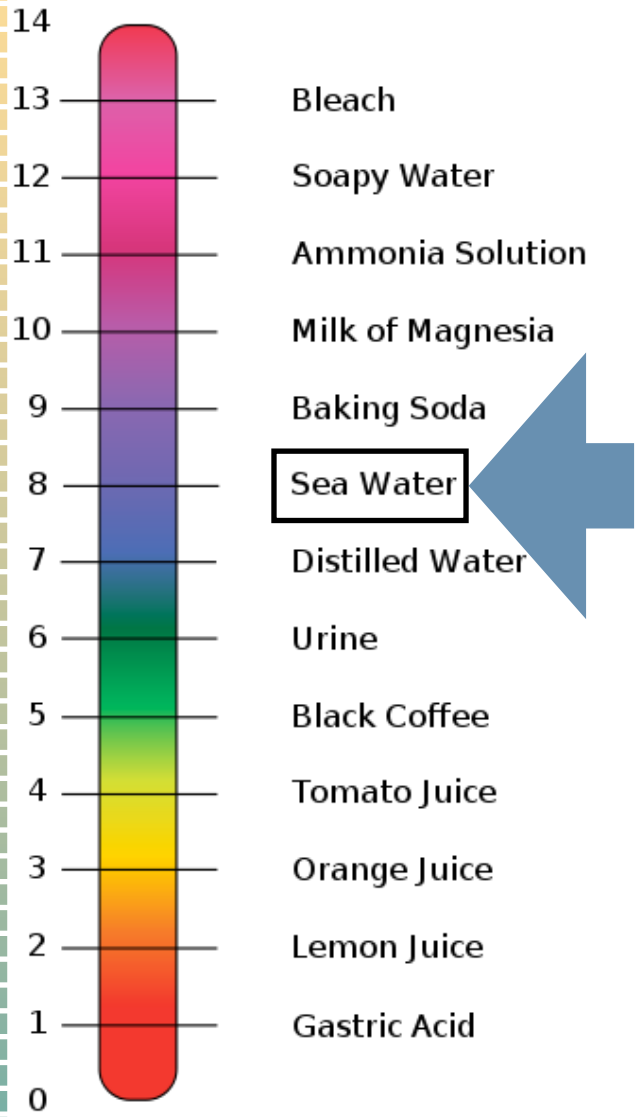
What is acidification?

For many people, this word is a bit of a mystery. To help you understand, the illustration alongside shows a list of liquids, which are common in most households. Sea water is just above the middle. Scale numbers at left are known as pH. Falling values are relatively more acidic. Rising values are more alkaline. Chemistry lab pure sulphuric acid is off the scale at -12!

Because oceans are absorbing more CO_2, making them more acidic, quality and abundance of seafood is suffering. Since pre-industrial times, pH has fallen by 0.1. from 8.25 to 8.14. In case this seems insignificant, pH is a log scale, which means that 0.1 pH change means 30% more acid!!

The oceans are vast 71% of world surface area. In the diagram at right, you can see gastric acid at pH1. This is the fluid in your stomach. Some people are prone to acid indigestion, very painful. They can get back to normal by taking milk of magnesia. Our oceans are so vast that unless we reduce CO_2 emissions, very soon, they'll be acid forever. There's no milk of magnesia to repair such huge damage we've caused.



What is Ocean Acidification?

How our oceans are being affected by Climate Change

Living in such a beautiful part of the world. why do we need to take Climate Change seriously? We can easily get a false sense of security from our clean and pleasant oceans and beaches. But our air and oceans are actually shared, as they circulate around the rest of the world. We need to care about things like Antarctic sea ice and what's happening along the coast of South America to understand what might be coming to our part of the Pacific Ocean.

GroundSwell Bass Coast is a new community group concerned with Climate Change. We're organising events to help us all understand risks and consequences of Business-as-usual lack of action to reduce GHG(Green House Gas) emissions.

Oceans absorb 25% carbon dioxide compared with 18% for all land based ecosystems. They're also source of rainfall, all fresh water and major proportion of food supply for the world.

So why not email GroundSwell Bass Coast, to make some friends and share knowledge about why our oceans are so important?

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…for a safe climate
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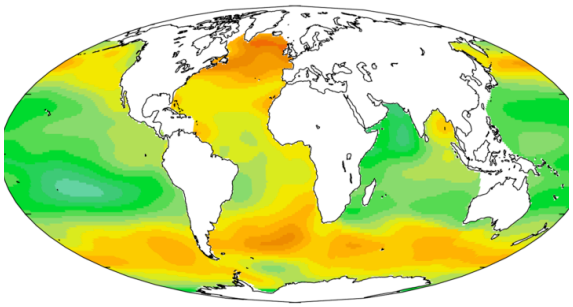
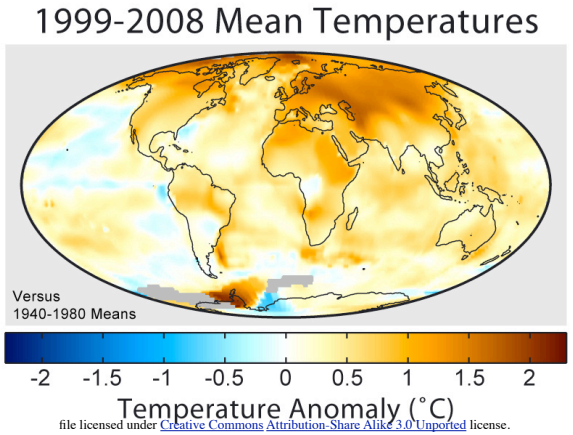
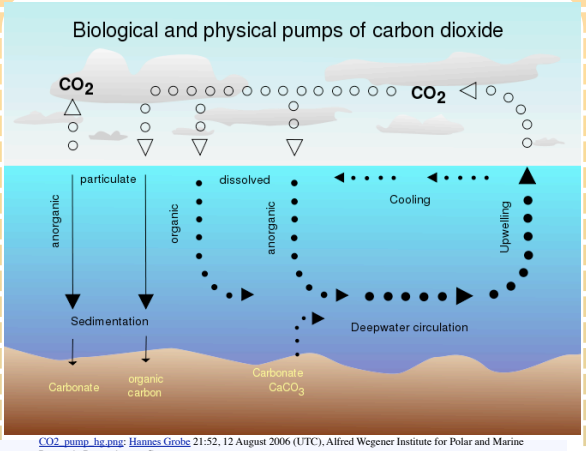


http://en.wikipedia.org/wiki/Ocean_acidification

Δ sea−surface pH [−]

2 −0.1 −0.08 −0.06 −0.04 −0.02





CO2_pump_hg.png: Hannes Grobe 21:52, 12 August 2006 (UTC), Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

OCEANS ABSORB MORE CO_2 THAN LAND

Oceans are the engine of Climate

Oceans are the engine and winds are the fuel to drive Climate. North of Equator, powerful currents flow around the edge of oceans, in a clockwise direction. South of Equator, current direction is anti-clockwise.

Nurseries for fundamental marine life are enclosed in currents which circulate around polar ice caps. Benevolent algae, plankton and krill mostly originate at the Poles.

The Humboldt current flows up the coast of South America to join the South Equatorial Current which flows down the coast of Australia towards the Antarctic to join the CircumPolar current running east. This circulation brings marine nutrients from the Antarctic. Calcium is recycled, also as run off, from land into rivers, combining in oceans with carbon dioxide(CO_2), to form calcium carbonate, the basis of all shell and skeleton structures in seafood creatures.

Everything is in mutual delicate balance. As oceans get too acidic, shell material dissolves, creatures become extinct. If we stopped CO_2 emissions tomorrow,science shows a big time lag, acidity of oceans continuing to rise for 500years!!!

Warm oceans recycle less CO_2

Per above, global warming isn't evenly distributed. Recent Australian news reports that Polar ice caps are melting more quickly than even the most pessimistic predictions.

As oceans warm, microscopic algae, which absorb calcium with CO_2, can't get more calcium. Imbalance excess CO_2 then attaches to water molecules, making carbonic acid. By 2050, some oceans will be as acidic as industrial waste.

CO_2 and Global Warming are causing a blanket of warm water around the equator. This floats high, preventing food/oxygen rich currents "upwelling", from deep oceans. This means much reduced food for bigger marine life, also more incidence of malevolent toxic algal blooms, only noticed previously in fresh water. More warming again circulating to poles to melt more ice.

When in balance, abundant plankton release gas dimethyl sulphide, at surface of oceans, essential in forming rain clouds which also reflect solar heat. If not in balance, US Defence Dept "believe" they can fix it, using missiles, to deliver reflecting sulphites to upper atmosphere.

The CO_2 cycle

Diagram above shows vertical flow of CO_2, an essential component in our oceans. But all systems in nature are very finely balanced. Man made CO_2 has already overloaded the balance.

As mentioned earlier, oceans perform 25% of continuous absorption of CO_2. It's important to distinguish that, as a long term reservoir of carbon, oceans contain six times more CO_2 than all plants and soils.

CO_2 lingers in the atmosphere, for an estimated 500 years before it's absorbed. It traps 100,000 times more infra red heat, reflected back to earth surface, than burn heat that caused it.

New economy, zero carbon electricity, wind and large scale solar, can stop adding CO_2 to atmosphere. CO_2 cycle is so far out of balance that it's not good enough to just stop GHG emissions. We need an excess of zero carbon electricity to enable active removal of CO_2 from atmosphere, to return to pre-industrial levels. If reduction of acidity is too slow, more marine creatures will become extinct. None of our technology will ever get them back.