

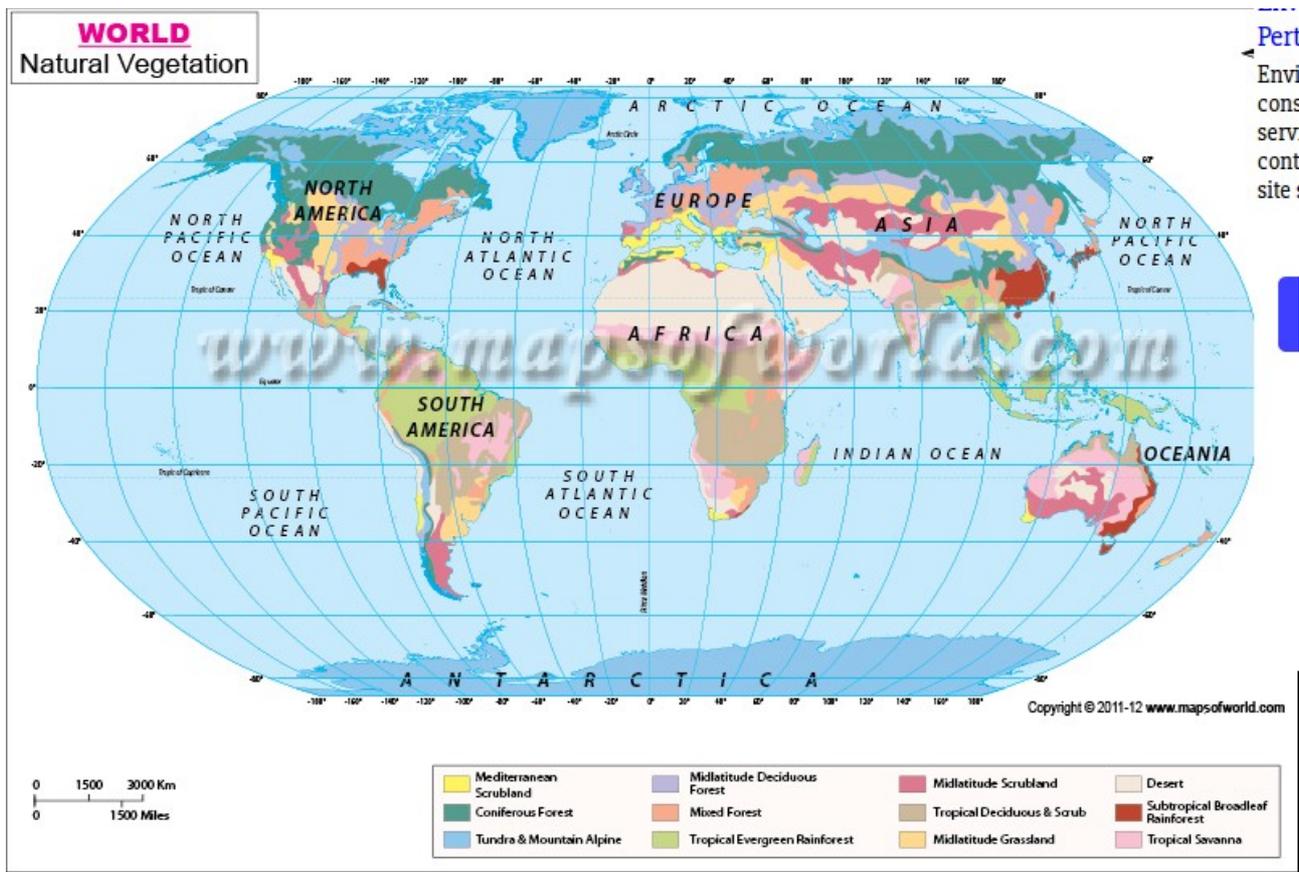
January 5, 2015

Mapping Carbon

John Reid

After ten years in the planning and numerous technical setbacks and glitches (which included a rocket failure) NASA's Orbiting Carbon Observatory – 2 (OCO-2) is finally sending high quality data back to earth. The satellite makes continuous, precise measurements of atmospheric CO₂ concentrations over most of the planet by means of absorption spectroscopy. The diagram is a compilation of mean atmospheric CO₂ concentrations for the 6 week period commencing 1st October 2014.

Hopefully this satellite is likely to be returning similar data for many years into the future so these results are only a tentative “sneak preview” of what is to come. They were obtained during northern fall and southern spring. Since CO₂ concentrations are most likely influenced by biological processing in plants, animals and fungi, future measurements in other seasons will be of prime importance in understanding the earth's carbon cycle.



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Nevertheless there are already some real surprises, viz.:

1. Over land, CO₂ concentrations are dominated by vegetation type – the high concentrations over South America, Southern Africa and Indonesia correspond closely to tropical evergreen rainforest and tropical deciduous forest and scrub (click on global vegetation map above).
2. There are unexpected but significant concentrations over the oceans. The concentrations in the South Atlantic and near Madagascar may well be due to an eastward drift from the nearby continental concentrations due to the general easterly trend in atmospheric circulation. However the concentrations east of Japan and north of New Zealand cannot be explained in this way, nor can the concentration near the southern tip of Greenland. Some of these have been attributed to tectonic activity in an [article by Prof. Martin Hovland of the University of Bergen](#).
3. There is little evidence that CO₂ from industry plays much part in the total scheme of things. Western Europe as a whole shows little evidence of excess CO₂ production apart from the Eastern side of the Adriatic Sea where there is little industrial activity. England appears to have been a net sink for CO₂ in autumn.
4. The high concentrations over China may well be due to industrial activity but it could also be attributed to excess emissions from subtropical broadleaf rainforest at this time of the year. We will have to wait another six months to get a clearer picture. A similar argument applies to the SE corner of the United States

It is already obvious that these observations are a serious embarrassment to NASA's front office. NASA's caption to this map reads as follows:

Global Atmospheric Carbon Dioxide

Global atmospheric carbon dioxide concentrations from Oct. 1 through Nov. 11, as recorded by NASA's Orbiting Carbon Observatory-2. Carbon dioxide concentrations are highest above northern Australia, southern Africa and eastern Brazil. Preliminary analysis of the African data shows the high levels there are largely driven by the burning of savannas and forests. Elevated carbon dioxide can also be seen above industrialized Northern Hemisphere regions in China, Europe and North America.

This cannot go unchallenged:

above northern Australia,

er, that country is called Indonesia, I-n-d-o-n-e-s-i-a. Perhaps it is politically incorrect to name a third world country in this context.

high levels driven by burning of savannas and forests

Indeed? Levels that massively exceed the industrial emissions of Western Europe? I look forward to the peer-reviewed paper on this one. That certainly is a lot of grass.

Elevated carbon dioxide can also be seen above industrialized ...Europe Where? I must be looking at a different map.

The situation may well change as more data becomes available – new ideas will certainly emerge and it may be decades before it is all understood.

The fact remains that in six weeks this satellite changed the face of climate science. NASA should be proud of the people who carried this through and not seek to obfuscate their findings.

4 thoughts on “Mapping Carbon”

Vera Prevalabit

NASA exercise turning up some interesting stuff – just in time for Paris 2015.

Developing world attribution of greatest global CO2 emissions to developed world may turn out to be (at best) a dubious hypothesis, thus making its demands for ‘climate reparations’ even shakier.

ABChester

NASA is primarily a media machine so I am not surprised that anything they release might distort or bias the facts. Especially since countries like India are achieving for a miniscule budget what costs NASA a fortune, and private companies are closing in on their (extraterrestrial) turf.

It is clear that the summary of the CO2 map is poor and inaccurate and may have the old anti-science approach of moulding the data to fit predetermined ideas. I am not convinced against man induced global warming but I do feel that natural variations and non-man-made influences probably play a part.

Prof Cliff Ollier

I agree with you entirely that the terrestrial pattern simply follows vegetation. No need for forest fires, etc.

Over the sea the situation is more complex. I see no point in cherry-picking a few spots and guessing tectonic correlations. The pattern fails to pick up sea floor spreading sites, or the global distribution of volcanoes.

It will be interesting to see how the pattern changes with time – or if it does.

Rob Thompson.

“To every complex problem there is a simple solution”.

It is invariably wrong.

I first heard of scientific concern for increased atmospheric CO₂ at a science day visit to Syd. Uni. with my ten year old son, 32 years ago. Our academic hosts suspected anthropogenic causes. The graph line illustrating increased CO₂ was geometric comprising horizontal and vertical steps of six month intervals. These were credibly explained by northern hemisphere deciduous forests.

More recently I attended Prof. Garnaut’s final lecture at the University of Tasmania and heard that the case for global warming was proven by a consensus of scientists with a guilty verdict on human habitation. Supporting evidence ignored major variables such as farting cows, vehicle exhausts, erupting volcanoes, tectonic activity, etc.

SCC (single cause certainty) propelled the economics professor to a quantitative diagnosis of how we can eliminate the effect of human existence on climate change. This was based on computer modeling presented as as science. This jingoistic political course can only wreck our best hope of improving the well being of all – the global economy.