# Global Warming 2020

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## Wilkins Ice Shelf,

**Global Warming Articles : Wilkins Ice Shelf, Near Antarctica, Hanging By Its Last Thread**

The Wilkins Ice Shelf is experiencing further disintegration that is threatening the collapse of the ice bridge connecting the shelf to Charcot Island. Since the connection to the island in the image centre helps to stabilise the ice shelf, it is likely the break-up of the bridge will put the remainder of the ice shelf at risk.

This animation, comprised of images acquired by Envisat's Advanced Synthetic Aperture Radar (ASAR) between 30 May and 9 July 2008, shows the break-up event which began on the east (right) rather than the on west (left) like the previous event that occurred last month. By 8 July, a fracture that could open the ice bridge was visible.

> According to the image acquired on 7 July 2008, Dr Matthias Braun from the Center for Remote Sensing of Land Surfaces at Bonn University estimates the area lost on the Wilkins Ice Shelf during this break-up event is about 1350 km² with a rough estimate of 500 to 700 km² in addition being lost if the bridge to Charcot Island collapses.

This break-up is puzzling to scientists because it has occurred in the Southern Hemispheric winter and does not have characteristics similar to two earlier events that occurred in 2008, which were comparable to the break-up of the Larsen-A and -B ice shelves.

"The scale of rifting in the newly-removed areas seems larger, and the pieces are moving out as large bergs and not toppled, finely-divided ice melange," said Ted Scambos from the National Snow and Ice Data Center who uses ASAR images to track the area.

"The persistently low sea ice cover in the area and data from some interesting sources, electronic seal hats [caps worn by seals that provide temperature, depth and position data] seems to suggest that warm water beneath the halocline may be reaching the underside of the Wilkins Ice Shelf and thinning it rapidly - and perhaps reaching the surface, or at least mixing with surface waters."

Prof. David Vaughan of the British Antarctic Survey (BAS) said: "Wilkins Ice Shelf is the most recent in a long, and growing, list of ice shelves on the Antarctic Peninsula that are responding to the rapid warming that has occurred in this area over the last fifty years.

"Current events are showing that we were being too conservative, when we made the prediction in the early 1990s that Wilkins Ice Shelf would be lost within thirty years - the truth is it is going more quickly than we guessed."

The Wilkins Ice Shelf, a broad plate of floating ice south of South America on the Antarctic Peninsula that is connected to Charcot and Latady Islands, had been stable for most of the last century before it began retreating in the 1990s.

By studying ESA ERS SAR satellite images since the 1990s, Braun and his colleague Dr Angelika Humbert from the Institute of Geophysics, Münster University, have found the Wilkins Ice Shelf has break-up events with loss of large areas rather than underlying ordinary, continuous calving.

For instance, in February 2008 an area of about 400 km² broke off from the Wilkins Ice Shelf, narrowing the ice bridge that connects it to Charcot and Latady Islands down to a 6 km strip. From 30 to 31 May 2008 it experienced further break-up with an area of about 160 km² breaking off, reducing the ice bridge to just 2.7 km.

Braun and Humbert are monitoring the ice sheet daily via Envisat acquisitions as part of their contribution to the International Polar Year (IPY) 2007-2008, a large worldwide science programme focused on the Arctic and Antarctic.

Satellite data are essential for observing polar regions. Envisat's ASAR instrument is able to produce high-quality images, even through clouds and darkness. Therefore, it is particularly suited to acquire images over Antarctica during the local winter period where hours of daylight are limited and cloud cover is quite frequent.

"ESA provides daily ASAR images that are easily accessible to scientists. It is particularly rewarding for us to see that the Envisat data are essential for scientists to quickly and easily observe these ice-shelf phenomena – a luxury that was not available to the scientific community a few years ago," ESA Envisat Mission Manager Henri Laur said.

"ESA is committed to continue monitoring the polar areas with Envisat and in the future with the GMES Sentinel-1 satellite."

In an effort to ensure as much SAR data as possible is made available to scientists and polar region projects during IPY, ESA is coordinating with other space agencies worldwide, such as Japan's JAXA, the Canadian Space Agency and the German and Italian space agencies, to acquire additional SAR data over these areas with their own satellites.

Source: Global Warming articles at ScienceDaily.com

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## Ocean Wind Power Maps

**Global Warming Articles : Ocean Wind Power Maps Reveal Possible Wind Energy Sources**

Efforts to harness the energy potential of Earth's ocean winds could soon gain an important new tool: global satellite maps from NASA. Scientists have been creating maps using nearly a decade of data from NASA's QuikSCAT satellite that reveal ocean areas where winds could produce wind energy.

The new maps have many potential uses including planning the location of offshore wind farms to convert wind energy into electric energy.

> "Wind energy is environmentally friendly. After the initial energy investment to build and install wind turbines, you don't burn fossil fuels that emit carbon," said study lead author Tim Liu, a senior research scientist and QuikSCAT science team leader at NASA's Jet Propulsion Laboratory in Pasadena, Calif. "Like solar power, wind energy is green energy."

QuikSCAT, launched in 1999, tracks the speed, direction and power of winds near the ocean surface. Data from QuikSCAT, collected continuously by a specialized microwave radar instrument named SeaWinds, also are used to predict storms and enhance the accuracy of weather forecasts.

Wind energy has the potential to provide 10 to 15 percent of future world energy requirements, according to Paul Dimotakis, chief technologist at JPL. If ocean areas with high winds were tapped for wind energy, they could potentially generate 500 to 800 watts of energy per square meter, according to Liu's research. Dimotakis notes that while this is slightly less than solar energy (which generates about one kilowatt of energy per square meter), wind power can be converted to electricity more efficiently than solar energy and at a lower cost per watt of electricity produced.

According to Liu, new technology has made floating wind farms in the open ocean possible. A number of wind farms are already in operation worldwide. Ocean wind farms have less environmental impact than onshore wind farms, whose noise tends to disturb sensitive wildlife in their immediate area. Also, winds are generally stronger over the ocean than on land because there is less friction over water to slow the winds down - there are no hills or mountains to block the wind's path.

Ideally, offshore wind farms should be located in areas where winds blow continuously at high speeds. The new research identifies such areas and offers explanations for the physical mechanisms that produce the high winds.

An example of one such high-wind mechanism is located off the coast of Northern California near Cape Mendocino. The protruding land mass of the cape deflects northerly winds along the California coast, creating a local wind jet that blows year-round. Similar jets are formed from westerly winds blowing around Tasmania, New Zealand, and Tierra del Fuego in South America, among other locations. Areas with large-scale, high wind power potential also can be found in regions of the mid-latitudes of the Atlantic and Pacific oceans, where winter storms normally track.

The new QuikSCAT maps, which add to previous generations of QuikSCAT wind atlases, also will be beneficial to the shipping industry by highlighting areas of the ocean where high winds could be hazardous to ships, allowing them to steer clear of these areas.

Scientists use the QuikSCAT data to examine how ocean winds affect weather and climate, by driving ocean currents, mixing ocean waters, and affecting the carbon, heat and water interaction between the ocean and the atmosphere.

The research, published in early July in Geophysical Research Letters, was funded by NASA's Earth Science Division.

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## Global Warming Explained

**Global Warming Articles : Global Warming Explained by Jonathon Hardcastle**

Global warming is thought of as one of the biggest threats to world security in modern times, and it is arguably already taking its toll in our weather system. By a combination of natural cyclical progression, and the impact of human behaviour and activity over the last century, the Earth is steadily seeing the effects of the global warming phenomenon. But what exactly is global warming, and exactly what impact could it have on our environment?

> Global warming can be defined as an overall gradual increase in world temperature over time. This is measured by averaging Earth and Ocean temperature, and has shown a steady upwards trend over recent decades. Furthermore, it is thought that over the last half a century, this has been a result of human civilisation and industrialisation. One of the major contributors to global warming is what is known as greenhouse gas, which comprises largely of carbon dioxide from general human activity.

Global warming as a process is thought to be highly devastating in terms of its effect on the climate. 'Climate change' is a phrase which is often use in association with global warming, and it has potentially catastrophic consequences for the world in which we live. 'Climate change' also covers global cooling, which can also occur as a result of human activity and greenhouse gases, and reflects a substantial change in the world's climate, which could change our habitat beyond recognition. This could be characterised by unusual weather patterns, resulting in more frequent natural disasters, which could in turn lead to political and social chaos in the decades and centuries to come.

There are a number of international political treaties which have been set up to change the progress of global warming, although their tangible upshots still remain to be seen. Through political cooperation, it is hoped that environmental targets can be met on an international scale, to make a real difference to the environment. However, at a personal level, there is significant scope for helping, rather than hindering the world in which we live, including recycling household waste, and reducing personal carbon emissions.

Global warming is arguably one of the biggest threats to human civilisation, and it is something which requires a drastic change in lifestyle to reverse. However, with a personal and political impetus, it is hopeful that the damage done to the planet can be reversed for future generations to enjoy.

**About the Author**

Jonathon Hardcastle writes articles on many topics including Business, Employment, and Society

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## Global Warming and Ozone Layer

**Global Warming Articles : Global Warming and Ozone Layer, Do you know the difference? by Peter Welsummer**

Working in the environment team for large coal fired power station, I often get into the debate about the Green house effect or "Global Warming". Quite often in my debates I often here the other person claim "The Green house effect is all a big lie, it was only the other week I heard on the news that the hole in the ozone layer is getting smaller" or "didn't we change the gas in our refrigerators years ago to stop global warming?" The difference between the Greenhouse effect and the hole in the Ozone Layer has been a point of confusion for many people. So do you know the difference?**The Greenhouse Effect**

The Greenhouse effect was proposed by Joseph Fourier in 1824 and first investigated quantitatively by Swedish scientist Svante Arrhenius in 1896. The Earth receives energy from the sun in the form of visible and invisible radiation, including light. The earth absorbs around 70% of this radiation and reflects the remaining 30% back out into outer space. The greenhouse effect is the process of increasing the amount of radiation being absorbed by the earth, while decreasing the amount that is reflected. So how are we absorbing more radiation? Most of the visible radiation is absorbed, or reflected by the earth it self. Ever been to the beach or snow on a really sunny day? That glare in your eyes is the sun's light being reflecting back into outer space. The invisible radiation or "infrared waves", however, are reflected by the atmosphere, not by the ground. The amount of reflection depends on the concentration of gases such as water vapour, carbon dioxide and methane in the atmosphere. Increasing the concentrations of these components, increases the amount of invisible radiation the earth is absorbing. So how bad is it? With simple laboratory tests, Arrhenius, predicted that a doubling the carbon dioxide concentration in the atmosphere, the temperature will rise by about 5oC. This a large enough rise to cause serious havoc with the worlds environments, such as melt glaciers, cause an increase in storm severity and prolong droughts.

**The Hole in the Ozone Layer**

While global action to reduce carbon dioxide emissions is still only in the infant stages, the story about the hole in the ozone layer is becoming better every day. That's because the hole is shrinking. The atmosphere above the earth is made up of many layers. The lowest layer, reaching between 11 to 20km above the earths surface is the troposphere. This is the region where the green house gases are being trapped. Higher up above. Above this region is the stratosphere, ranging from 11km to 50km above the earths surface. In this region the ozone layer can be found. While the ground absorbs the visible radiation, the greenhouse gases in the troposphere absorb the infrared radiation, the ozone layer in the stratosphere reflects, ultraviolet (UV) radiation.

> Ozone, O3, is composed of three oxygen atoms joined together to make a single molecule. This molecule is specially designed to absorb a different kind of radiation again, ultra violet (UV) radiation. Absorbing UV radiation is of great importance to us humans as it is the main cause of skin cancers.

So how does the hole in the ozone layer differ from the greenhouse effect? The biggest difference is that the hole in the ozone layer is caused by O3 molecules disappearing, while the green house effect is caused by the amount of carbon dioxide molecules increasing in the atmosphere. Another difference is that the hole in the Ozone layer is a good news story! The hole in the ozone layer was chiefly caused by another group of chemicals called "organohalgen compounds" especially "chlorofluorocarbons" (CFCs). These chemicals were once found in everything from spray cans to refrigerator and air-conditioning gas. One highly stable CFC gas molecule could break down at least 100,000 ozone molecules.

So to stop a massive increase in sun cancer around the world, governments acted. In 1987 an international treaty was signed, the Montreal Protocol, which limited CFC production, before banning it all together in 1996. Since that date, scientists have reported the rate of decline in the layer has slowed dramatically, and some have even reported the hole is repairing itself.

So now you have no excuse to confuse the two phenomena! The difference between the hole in the ozone layer and the green house effect is first is being caused by a disappearing ozone gas, and the second is being caused by to much carbon dioxide! While the ground absorbs the visible radiation, the greenhouse gases absorb the infrared radiation in the troposphere, the ozone layer reflects a different type of radiation, ultraviolet (UV) radiation.

Peter Welsummer Editor: http://www.thenaturegarden.com

**About the Author**

Peter Welsummer is the editor of **http://www.thenaturegarden.com**. You DIY Gardening and Environmental Article Site.

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# Is Global Warming Good for Ski Resorts?

**Global Warming Articles : Is Global Warming A Good Thing For High Altitude Ski Resorts? by Mark Scriven**

Global warming and the associated changes in climate are being caused by the so-called "greenhouse" effect, which is raising the temperature of the Earth's atmosphere. Global temperatures have been forecast to increase from 1.5 to 6.0 degrees Celsius by the end of this century. Since nine of the ten warmest years have occurred in the past decade, skiers have been amongst the first spots lovers to be affected by the changing climate. While they are naturally concerned at how this may affect their sport, they can make choices in their skiing destinations which will increase their chance of having a good time at the snow.Some ski resorts will get more snow

> While many low-level ski resorts may have to shut down, as reduced snowfall makes them uneconomical, high altitude resorts such as Méribel and the Trois Vallées in France, where 80 percent of skiing is above 2,000 meters, will experience greater precipitation and snowfall. While many ski resorts are moving uphill and impacting on ecologically sensitive areas, high altitude Méribel is building on its long heritage of eco-friendly policies to strengthen and consolidate its green ski facilities and maintain its reputation as having some of the world's finest ski runs.

Méribel has been pioneering and instituting environmental controls since it was established in 1938. These included green building codes such as energy-saving roof and wall insulation, and mandatory construction of underground parking. Today, traffic reduction is encouraged by the provision a free shuttle bus system and a network of cross-country pedestrian trails that connect the various resort areas. On-piste organic toilets are a recent innovation that helps reduce pollution.

Waste recycling is mandatory, vehicles run on bio-diesel, and snow cannons and trail-groomers powered by renewable hydroelectric power have been installed. At Val Thorens, the highest resort of the Trois Vallées, the lifts are also hydro-powered.

Many skiers choose to remain after the snow has melted to take part in piste cleaning work at the season's end. As well, ecologically sensitive areas are checked for damage and replanted with appropriate species to insure, as much as possible, that biological diversity is maintained. Around Val Thorens, for example, over 200,000 trees have been planted in the last 20 years.

Global Warming could strengthen higher altitude resorts

Europe's 2006-2007 winter season is on record as the warmest since 1950, with average temperatures 2.1 degrees higher than normal. Since resorts located below 1,500m experienced little snow cover on their lower slopes, the media was quick to report the end of skiing as a sport. But resorts, indeed regions, will continue to experience good and bad ski seasons, leading to longer or shorter periods suitable for snow sports.

With heavier precipitation, including snow, high altitude resorts will continue to be a safe bet for snow sports enthusiasts, and businesses here could well experience a boom as competition from other lower resorts declines. Of course, the greater visitation of higher areas will put strains on existing infrastructure and the environment, but the green ethic has been embraced by a new breed of dedicated skiers who see the survival of their sport tied in with the survival of the planet.

**About the Author**

Rod Ritchie, a travel writer and editor, writes for many publishers including AA Publishing and Fodors. Purple Ski offer a selection of luxury catered ski chalets in Meribel.

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