

Satellites and World Heritage sites, partners to understand climate change

The Belgian Science Policy Office and UNESCO present this exhibition at the Parc du Cinquantaire in Brussels

Climate change: 2003 was the hottest summer ever in Europe; in 2005 a hurricane of unequalled strength, Wilma, destroys Cancun in Mexico; in 2010 Belgium suffered the worst rain of the last 50 years, torrential rain across Belgium caused floods and mudslides, killing at least two people near the French border; in 2011 Vietnam faced exceptional floods never seen before.

Glaciers are melting and corals are dying as the sea warms up. The Egyptian pyramids have survived over 3,000 years until today; the species living in the Galapagos have been evolving over thousands of years; Machu Picchu is an amazing reminder of the Inca civilization. These sites are among those with an outstanding universal value and must be preserved for future generations. They constitute common legacy, which is why the United Nations Educational, Scientific and Cultural Organization (UNESCO) has defined them as World Heritage sites.

Climate Change is now threatening the conservation of these sites, and satellites have flown to the rescue of World Heritage.

Exhibition in the Parc du Cinquantaire from 13th March to 24th May

During this period the Belgian Science Policy Office (BELSPO) and UNESCO will be showing to the population of Brussels, to its teachers and students, how satellites are helping to understand the effects of climate change on famous World Heritage Sites. This exhibition organized by BELSPO is done in partnership with UNESCO and its associated space partners. It is important to notice that BELSPO is an outstanding space partner of UNESCO and as a consequence BELSPO assists UNESCO in the monitoring, with space technologies, of the famous World Heritage sites.

The glaciers of Patagonia are melting, as are those of the Everest, the highest mountain on Earth. Desertification is gaining ground in Africa, and the resulting sand storms are burying and damaging the great mosques in Timbuktu, the Giza pyramids and many other sites. Heavy rains are undoing Inca adobe structures such as those of Chan Chan in Peru; higher sea temperatures are killing coral reefs in Australia and Guatemala; rising sea levels are threatening a number of coastal and riverine World Heritage sites that could be flooded suddenly. The conservation of sites like Calakmul, Mexico's natural lung, is of foremost important as the tropical forest absorbs greenhouse gases, etc.

The exhibition explains in detail, in an easy and pleasant way, a wide variety of climate change effects on World Heritage sites. Besides the satellite image, each panel also shows pictures of some outstanding aspects of the site. To facilitate the visit for a broad audience, the descriptions are in English, French and Dutch.

The exhibition also meets educational objectives. A catalogue is available to enable teachers to prepare for the visit in class. The exhibition explains the inputs provided by space technologies to understand the causes and effects of climate change on these sites. These effects are measured using satellite technology.

Satellites record images of the same places from their orbit, on each passage, from one year to the next, building a priceless database of satellite images. The fact that we can compare today's situation with the state of our planet 40 years ago and see how humanity has been reshaping it helps us to plan future development in a sustainable manner and above all, taking into account the challenges of climate change.

One important aspect of the exhibition is the overall introductory panels showing the climate change effects at continental level. For these panels, images of the SPOT VEGETATION sensors have been used. Belgium has been, via BELSPO, one of the most active partners in the VEGETATION programme. The satellite images were processed by University of Louvain.

Satellites partners in understanding climate change

Satellites allow us to obtain the scientific data necessary to understand Earth's complex climate, and particularly the effects of the current climate change. The main space agencies have agreed to use its next generation of satellites to monitor climate change. The objective is to make sure that the satellites launched over the next 20 years keep monitoring such parameters as the sea level, clouds, polar caps, tropical forests, greenhouse gases, etc.

Continued measurements over the long term are necessary in order to mitigate climate change.

There is now a greater variety of satellites available to give operational data concerning the planet's climate each and every day.

Contributors to the exhibition

UNESCO worked closely with over 60 space partners from all over the world to put this exhibition together. Particularly, Planet Action's cooperation made it possible. Planet Action is the non-profit programme of a French company called Spot Image. Planet Action offers high quality images to be used in activities aiming to understand and mitigate the effects of climate change.

The exhibition also counted with contributions from the German Space Agency (DLR), the European Space Agency (ESA) and the Belgium Federal Office for Science policy (BELSPO).

The Flemish Government of Belgium generously funded the development of this exhibition.

Annex 1

Examples of climate change

What is climate change? Let's look at a few specific examples.

The 2003 heat wave in Europe

The summer of 2003 (northern hemisphere) was characterized by a heat wave in Europe; its duration and intensity reflected extremely high relative temperatures.

There were dramatic consequences for ecosystems, the population and infrastructures. As was to be expected, the countries of the South of Europe registered the highest temperatures. The highest temperature registered that summer was in Denia, in the Alicante province of Spain, where thermometers rose to 48.7 °C, one of the highest temperatures ever measured in Spain.

Hurricane Wilma floods the hotel area in Cancun

The month of October 2005 came with one of the strongest hurricanes ever seen in Cancun. The mighty hurricane Wilma hit the paradisiacal beaches of the Mexican Caribbean hard, with intense and sustained 250 km/h winds and heavy rainfall. The sea and rain combined caused a flood that rose 5 to 8 m in Cancun's hotel area.

After hitting land in Cancun as a category 5 hurricane on the Saffir-Simpson scale (on a scale of 5), Wilma diminished to category 3 but remained extremely dangerous, wreaking damages in the United States as well.

Climate change causes more intense rainfall in Central America

There was a great threat to Central America in the month of August 2009. The main climate change related threat facing the region is caused by the 'water cycle', as precipitations are increasingly intense and concentrated according to the records of the region's meteorological agencies.

Precipitations exceeded all previously recorded levels in the region in May 2009. In the case of El Salvador, there were 1,943 mm of accumulated rainfall between the months of May and August, when the historical average was of 1,215 mm and the previous maximum had been 1,543 mm, in 1996.

Squalls of rain and landslides battered Guatemala, with many dead or missing. The levels registered until 31 August 2009 exceeded those registered in 2005 and 2008, which had been the highest in the decade according to the records of the Guatemalan Meteorological institution.

Global warming to blame for the greatest rain season in Mexico's history

Mexico faced the greatest rain season in its recorded history in 2010. Several Southern and South-eastern states were flooded following the record rains. Fortunately, the tropical storm Hermine only caused minor damages as it passed through Tamaulipas in the North-east of Mexico, with more floods, and water and electricity shortages.

The highest precipitations ever recorded occurred in July and August 2010.

'This situation stems from many circumstances; of these, climate change is central: the way human beings are affecting the atmosphere in civilization, driven by carbon, smoke, and the intensive use of fossil fuels' highlighted the President of Mexico. In his opinion, one of the central causes of current events is global warming, which has brought about 'severe' alterations in the Earth's average temperatures and climate.

'If climate change has had consequences anywhere, it is in Mexico', added the Mexican President, citing as an example July 2009, the second driest month in the country in 67 years, and, a year later, 'came the rainiest month, also in recorded history'.

Meteorologists try to clarify the current climate phenomenon

Increasingly intense hurricanes, heavy rains in Mexico and Pakistan, landslides in China, extremely cold temperatures in Peru, and devastating forest fires until mid-August in Russia. Scientists are currently discussing whether such phenomenon's are due to climate change.