From science to services

Intro text for web

By the end of the month ESA will launch the Sentinel-3B Earth observation satellite to join its twin brother Sentinel-3A in orbit. Both satellites are part of Copernicus, the European Union’s earth observation programme lead by the European Commission. Copernicus aims at monitoring our planet and freely providing data for the Copernicus services, the scientific community and to any other interested party. In this video different examples of Sentinel-3 data usage for oceanic research are explored.

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| Image | Text |
| TITLE SENTINEL SERVICES |
| 10:00:10  Ext. Sea, Bob Surfing the waves, Plymouth, UK – 28/03/2018 – EURONEWS  Ext. Beach, Bob walking with surfboard, Plymouth, UK – 28/03/2018 – EURONEWS  Ext. Close up of Smartfin, Plymouth, UK – 28/03/2018 – EURONEWS  Ext. Sea, Bob Surfing the waves, Plymouth, UK – 28/03/2018 – EURONEWS  INT. GV Bob in his Laboratory, Plymouth Marine Laboratory; Plymouth,UK – 28/03/2018 – EURONEWS  INT. Close-up Bob’s Laptop, Plymouth Marine Laboratory; Plymouth,UK – 28/03/2018 – EURONEWS  ANIMATION of the Copernicus logos-2018 – ESA  Still. Sentinel-3A image of California – 2017 – ESA  Still. Rendered Sentinel-3A image of Hurricane Ophelia’s temperature – 2017 – ESA  Animation. Sentinel-3B 360-view – 2018 - ESA  Ext. Sea and beach, Plymouth, UK – 28/03/2018 – EURONEWS  EXT. Ocean stock footage– Video blocks  Animation. Sentinel-3 Earth Colour scan, Sea level scan and Temperature scan – 2017 – ESA | Surfing for science. It may seem far fetched, yet it is exactly how Dr. Bob Brewin of the Plymouth marine laboratory is pioneering a new technique in satellite oceanography. By equipping his surfboard with a device called a SmartFin Bob can measure sea surface temperature and motion of coastal waters with his smartphone. Later Bob can use the SmartFin data he has gathered to better interpret sentinel-3 satellite data.  The sentinel satellites are part of the Copernicus programme, the most ambitious Earth observation programme worldwide. It delivers satellite data for a wide range of services and applications. The sentinel-3A and 3B satellites are primarily focussed on our oceans which cover more than ¾ of the earths surface and are paramount for all life on earth. Using the three instruments on board, the satellites gather information on ocean colour, water quality, changes in sea level and most important for Bob’s research, sea surface temperature. |
| 10:01:20:19  INT. Bob in his Laboratory, Plymouth Marine Laboratory; Plymouth,UK – 28/03/2018 – EURONEWS | **ITW DR. BOB BREWIN - REMOTE SENSING SCIENTIST, PLYMOUTH MARINE LABORATORY & NCEO**  The temperature in the ocean is a fundamental component of our seas. It controls the physical environment through changes in density, together with salinity. It controls coastal currents. It’s also a fundamental component of marine biology, the growth and reproduction rates of the many organisms in the ocean are temperature dependent. It also controls the chemical reaction rates in the ocean, how gas is transferred between the atmosphere and the ocean is temperature dependent. |
| 10:01:50:06  Ext. Beach, Bob walking with surfboard, Plymouth, UK – 28/03/2018 – EURONEWS  Still. Sentinel-3A image of Italy land and water temperature – unknown date- ESA  Ext. Beach, Plymouth, UK – 28/03/2018 – EURONEWS  Ext. Ifremer reseachers at sea - Northsea, France – 03/04/2018 – EURONEWS  Ext. Close up of Smartfin, Plymouth, UK – 28/03/2018 – EURONEWS  Ext. Kayak at sea, yacht at sea - stock footage – Video blocks  Animation. Sentinel-3 flyby – ESA  Ext. Ifremer reseachers at sea - Northsea, France – 03/04/2018 – EURONEWS | In-situ data gathered by scientist like Bob is extremely important as it complements and helps to verify data provided by the Sentinel satellites. For example, the temperature of coastal waters is difficult to measure from space though they have very high levels of marine biodiversity. So scientist find new and innovative ways to increase the number of in-situ measurements in these waters for instance with the Smartfin with which surfers and other water sport enthusiasts can gather data, while enjoying their hobby.  But the Sentinel-3 data can also be used for other types of research. In the EUROHAB project the data is combined with in situ measurements to study harmful algal blooms or HABs at sea. |
| 10:02:36:14  Int. Ifremer Laboratories, Port en Bessin, France – 03/04/2018 - EURONEWS | **TANIA HERNÁNDEZ FARIÑAS - RESEARCHER IN PHYTOPLANKTON ECOLOGY, IFREMER** FRENCH !  "Le satellite il va capter de façon générale l’ensemble de la production du phytoplancton. Avec les données in situ on va être capable d'aller un peu plus loin et d'expliquer quelles sont les espèces qui  ont été captées par le satellite et de voir aussi s'il y a des espèces qui sont toxiques."  *"The satellite captures a broad view of the production of phytoplankton. With the in situ measurements we'll be able to go further and explain which species were seen by the satellite and to identify the species which are toxic."* |
| 10:02:55:13  Ext. Ifremer reseachers at sea - Northsea, France – 03/04/2018 – EURONEWS  INT. Ifremer reseachers in the Laboratory – Port en Bessin, France – 03/04/2018 – EURONEWS  INT. Close up Ifremer Laptop– Port en Bessin, France – 03/04/2018 – EURONEWS  INT. Ifremer reseachers in the Laboratory – Port en Bessin, France – 03/04/2018 – EURONEWS  Still. Sentinel image of Algal bloom at Belgian coast – ESA  Still. Sentinel image of Algal bloom at reindeer Island – ESA  Ext. GV of Plymouth, UK – 28/03/2018 – EURONEWS | Although the project researchers can only go out to sea once every two weeks they can rely on Sentinel-3 data which is accurate and delivered to the users on a daily basis. And while the scientists can cover only mall parts of the seas, satellite data covers the entire planet. By combining satellite data with the measurements at sea, patterns detected can be more easily explained and new applications can be tested. Like here in Plymouth where a team of scientists is checking in situ data with satellite images to see whether they can detect plastic and garbage accumulation in the oceans from space. |
| 10:03:35:05  EXT. Plymouth Marine Laboratory; Plymouth,UK – 28/03/2018 – EURONEWS | ITW Dr. Victor Matinez-Vicente – Bio-optical oceanographer, PLYMOUTH MARINE LABORATORY At the moment we are making an assessment of what would we need to look at from space to be able to detect plastics. We are going to do a horizon scanning exercise with all the technologies that are available from earth observation and we are considering mainly, because that is our expertise, optical methods. But then we’re also considering other remote sensing methods like SAR and as well indirect approaches like current measurements that transport plastic in the oceans. |
| 10:04:14:18  INT. EOC Building, DLR: People working - Oberpfaffenhofen, Germany – 25/09/2017 – ESA  Animation. Sentinel-3B 360-view – 2018 - ESA | Within the European Union’s Copernicus programme ESA continues to offer key Earth Observation data for the Copernicus services, science and research, providing almost real time information on the health of our planet |
| 10:04:38:22 | B-roll |
| 10:04:28:08  INT. Bob in his Laboratory, Plymouth Marine Laboratory; Plymouth,UK – 28/03/2018 – EURONEWS | **Soundbites**  **Dr. Bob Brewin - Remote Sensing Scientist**  **Plymouth Marine Laboratory & NCEO**  **English**  *- The problem is that we have little understanding of how accurate or how precise our satellite observations of temperature are in the nearshore and the reason being is that it’s critically under sampled. We have very few observational technologies that are making measurements of temperature in the nearshore environment.*  *- The idea is to take advantage of the vast number of recreational citizens who are regularly going in and out of the ocean, for fun. If we can harness that potential we can use these citizens to help collect observations of temperature, we can use those temperature observations and match them with our satellite datasets, and get a much better understanding of the accuracy and precision of these satellite observations and ultimately improve the sea surface temperature algorithms in that nearshore region. With over 30 years of thermal radiometry that we have now from our satellite platforms we can begin to get a really good understanding of how temperature is changing in the nearshore environment. And temperature is a critical component of our oceans, it controls the biology, through changes in growth rates and reproduction, it controls the physical environment together with salinity, it controls the density of the ocean, how coastal currents move, and it’s also a fundamental component of marine chemistry* |
| 10:06:08:11  Int. Ifremer Laboratories, Port en Bessin, France – 03/04/2018 - EURONEWS | **Soundbites**  **Dr. Francis Gohin, Researcher, Ifremer**  **French**   * *L'utilisation des satellites dites de la couleur de l'eau en côtier est complexe, parce que nous cherchons à identifier les phytoplanctons, mais il y a aussi des remises en suspension, des matériels minéraux, des sables, des vases, remis en suspension. Donc il faut faire la part des choses et arriver à retrouver des phytoplanctons à travers son pigment clé, qui est le pigment de la photosynthèse, le pigment chlorophyllien, et si possible identifier son espèce ou son groupe. Donc cela à partir de l'espace. Bien sur c'est extrêmement complexe, à partir de données qui sont acquises é 800km. Il nous faut absolument des mesures en terrain pour donner la vérité, la base qu'on doit trouver.* * *L'intérêt du satellite c'est de fournir une couverture, une vaste couverture, mais avant cela, particulièrement aux côtiers, il nous faut valider les méthodes. De façon qu'il y a un entier compatibilité entre le satellite et ce qui est observé en mer.* * *Nous avons traiter l'ensemble des données de capteurs dit de la 'couleur de l'eau' provenant de la NASA et de l'Agence Spatiale Européenne, depuis 20 ans, pour suivre l'évolution de la quantité des phytoplanctons au jour le jour sur la Manche et la Golfe de Gascogne dans les eau côtières. Et ce que nous avons observé, c'est relativement une baisse de cette quantité de phytoplancton, particulièrement les mois d'été* |
| 10:07:54:06  EXT. Plymouth Marine Laboratory; Plymouth,UK – 28/03/2018 – EURONEWS | **Soundbites**  **Dr. Victor Martinez-Vicente, Bio-optical Oceanographer, Plymouth Marine Laboratory**  **English**   * Evaluate whether current satellite Earth observation can discover plastics in the oceans * Why is this research needed? * Pushing the science to the limit |
| 10:09:18:04  Int. Ifremer Laboratories, Port en Bessin, France – 03/04/2018 - EURONEWS | **General views**  Ifremer Laboratory study of in situ samples |
| 10:10:19:19  Animation. 2018 - ESA | **ANIMATIONS**  Sentinel-3B 360 view  Senitnel-3 scanning sea-level  Sentinel-3 measuring land and sea temperature  Sentinel-3 measuring land and sea colour  Sentinel-3 deconstruction SLSTR instrument close-up  Sentinel-3 instruments overview |
| 10:14:47:15 | END |