WEYMOUTH ASTRONOMY

Sky Watcher

Volume 5, Issue 2
9 July 2010

Trips / Events

Ideas for trips and events always welcome!

events@weymouthastronomy.co.uk

Talks in the Area:

- **20 July BNSS—Light: Some of the amazingly detailed things a few photons can tell us about the universe - Speaker: James Fradgley**
- **21 July CADAS—Ask the experts evening**
- **31 July BNSS—The Founding of the Royal Society, 1660, including early astronomical researches and researchers. 2010 is the Royal Society's 350th anniversary - Speaker: Dr Allan Chapman**
- **3 Aug WAS—Do we need a new theory of gravity? Speaker: Dr Stuart Clark**
- **18 Aug CADAS—The Pacific Eclipse—Speaker: Jerry Workman**
- **7 Sept WAS—Space the next 50 years—Speaker: Dr David Whitehouse**

Upcoming Events:

6 Aug Sun and Moon Observing at Fleet Farm starting at 19:00

17 Sept or 24 Sept (Depending on weather) WAC club night at Durlston Rangers Station and Observatory in Swanage at 19:30

18 Oct DSLR Astrophotography by Peter Adshead

More to come!

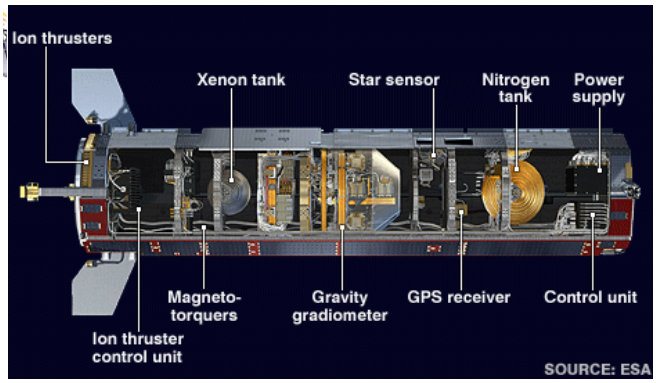
Club News

Last month brought the WAC Geoff Kirby and his account of Climate Change from an astronomical point of view. Always thought provoking!

The summer schedule is upon us with a programme providing several observing opportunities for the club. The first is a Sun and Moon viewing night to make the most of the late summer sunset and an opportunity to view the sun in H-alpha followed by views of a waning crescent moon.

The next event is scheduled at Durlston Country Park in Swanage to make use of the Wessex Astronomical Society's observatory. Check the WAC website for more details.

Until next month. *Starry Skies! SK*

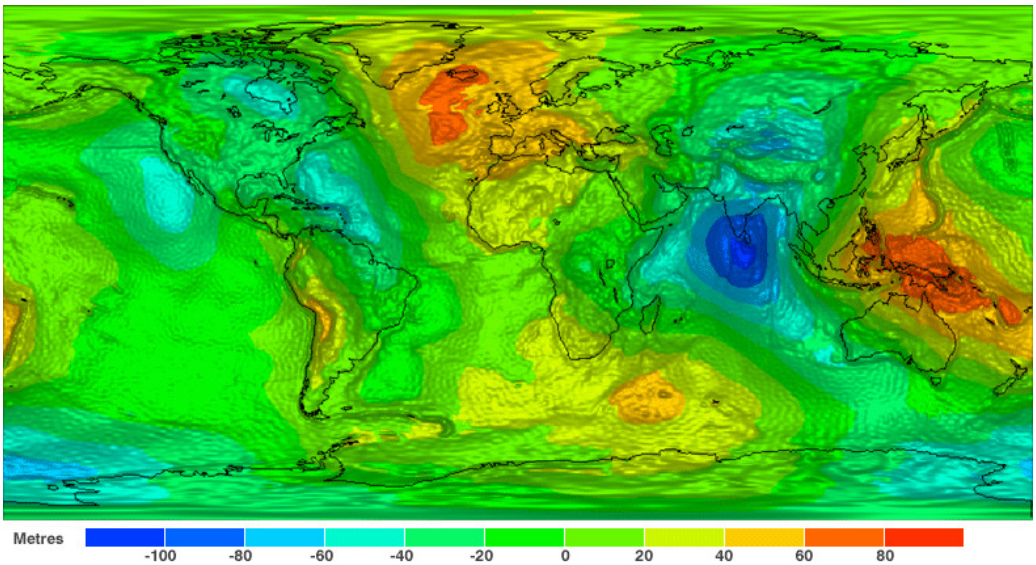


Goce satellite

The 1,100kg Goce is built from rigid materials and carries fixed solar wings. The gravity data must be clear of spacecraft 'noise'. The 5m-by-1m frame incorporates fins to stabilise the spacecraft as it flies through the residual air in the thermosphere. Goce's accelerometers measure accelerations that are as small as 1 part in 10,000,000,000,000 of the gravity experienced on Earth. The UK-built engine ejects xenon ions at velocities exceeding 40,000m/s; the engine throttles up and down to keep Goce at a steady altitude.

Goce satellite views Earth's gravity in high definition

By Jonathan Amos, BBC Science correspondent



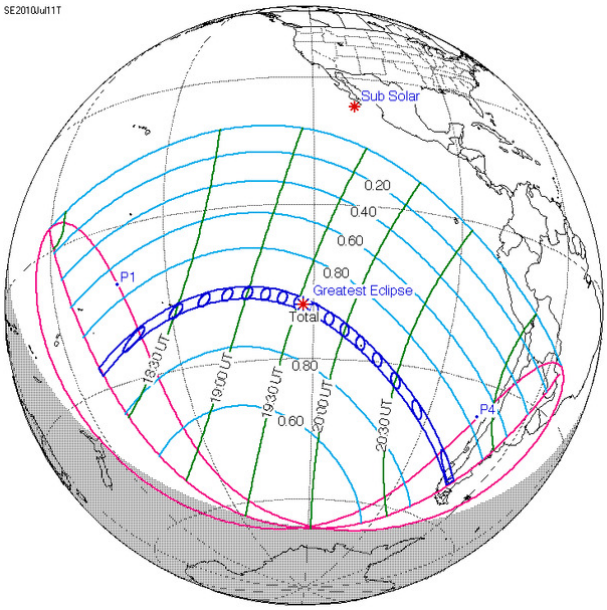
It is one of the most exquisite views we have ever had of the Earth.

This colourful new map traces the subtle but all pervasive influence the pull of gravity has across the globe. Known as a geoid, it essentially defines where the level surface is on our planet; it tells us which way is "up" and which way is "down". It is drawn from delicate measurements made by Europe's Goce satellite, which flies so low it comes perilously close to falling out of the sky. Scientists say the data gathered by the spacecraft will have numerous applications. One key beneficiary will be climate studies because the geoid can help researchers understand better how the great mass of ocean water is moving heat

(Continued on page 2)

GOCE *(continued)*

around the world. The new map was presented here in Norway's second city at a special Earth observation (EO) symposium dedicated to the data being acquired by Goce and other European Space Agency (Esa) missions. Europe is currently in the midst of a huge programme of EO development which will see it launch some 20 missions worth nearly eight billion euros before the decade's end. The Gravity Field and Steady-State Ocean Circulation Explorer (Goce) is at the front of this armada of scientific and environmental monitoring spacecraft. Launched in 2009, the sleek satellite flies pole to pole at an altitude of just 254.9km - the lowest orbit of any research satellite in operation today. The spacecraft carries three pairs of precision-built platinum blocks inside its gradiometer instrument that sense accelerations which are as small as 1 part in 10,000,000,000,000 of the gravity experienced on Earth. This has allowed it to map the almost imperceptible differences in the pull exerted by the mass of the planet from one place to the next - from the great mountain ranges to the deepest ocean trenches. Two months of observations have now been fashioned into what scientists call the geoid. "I think everyone knows what a level is in relation to construction work, and a geoid is nothing but a level that extends over the entire Earth," explained Professor Reiner Rummel, the chairman of the Goce scientific consortium. "So with the geoid, I can take two arbitrary points on the globe and decide which one is 'up' and which one is 'down'," the Technische Universitaet Muenchen researcher told BBC News. In other words, the map on this page defines the horizontal - a surface on which, at any point, the pull of gravity is perpendicular to it. Put a ball on this hypothetical surface and it will not roll - even though it appears to have "slopes". These slopes can be seen in the colours which mark how the global level diverges from the generalised (an ellipsoid) shape of the Earth. In the North Atlantic, around Iceland, the level sits about 80m above the surface of the ellipsoid; in the Indian Ocean it sits about 100m below. The geoid is of paramount interest to oceanographers because it is the shape the world's seas would adopt if there were no tides, no winds and no currents. If researchers then subtract the geoid from the actual observed behaviour of the oceans, the scale of these other influences becomes apparent. Geophysicists will also want to use the Goce data to try to probe what's happening deep within the Earth, especially in those places that are prone to quakes and volcanic eruptions. "The Goce data is showing up new information in the Himalayas, central Africa, and the Andes, and in Antarctica," explained Dr Rune Floberghagen, Esa's Goce mission manager. "This is, in one sense, not so surprising. These are places that are fairly inaccessible. It is not easy to measure high frequency variations in the gravity field in Antarctica with an aeroplane because there are so few airfields from which to operate." Goce's extremely low operating altitude was expected to limit its mission to a couple of years at most. But Esa now thinks it may be able to continue flying the satellite until perhaps 2014. Unusually quiet solar activity has produced very calm atmospheric conditions, meaning Goce has used far less xenon "fuel" in its ion engine to maintain its orbit. Ultimately, though, that fuel will run out and the residual air molecules at 255km will slow the satellite, forcing it from the sky.



Solar eclipse of July 11, 2010

A total solar eclipse will occur on July 11, 2010.[1] A solar eclipse occurs when the Moon passes between Earth and the Sun, thereby totally or partially obscuring Earth's view of the Sun. A total solar eclipse occurs when the Moon's apparent diameter is larger than the Sun, blocking all direct sunlight, turning day into darkness. Totality occurs in a narrow path across the surface of the Earth, while a partial solar eclipse will be visible over a region thousands of miles wide.

The eclipse will be visible over much of the southern Pacific Ocean, touching several small islands including Tuamotu in French Polynesia andEaster Island, as well as the southern tips of Argentina and Chile in South America.

We look forward to hearing how Chris Bowden's trip to Tahiti to sail and see the eclipse turns out next month at the Sun and Moon Observing event at Fleet Farm.