WEYMOUTH ASTRONOMY

Sky Watcher

Volume 12, Issue 12
13 April 2018

Trips / Events

Ideas for trips and events always welcome!

events@weymouthastronomy.co.uk

- 18 Apr CADAS—T'aint Rocket… - Bud Budzynski
- 1 May WAS—Debunking the Moon landing myth—Graham Bryant
- 16 May CADAS—Light pollution FAQ - Bob Mizon
- 5 June WAS—21cm - Studying the shape & motion of our galaxy from the back yard—Brian Coleman
- 18 June CADAS—Constellation Myths—Ron Westmaas

Programmes for many local Societies will be available in the near future.

Check their websites for more details.

If you are interested in giving a talk or workshop, let the organisers know. They like to offer new titles in their programme line-up.

WAC Upcoming Events:

11 May—AGM + James Fradgely - Birth of the Solar System

8 June—Ask the Panel

13 July—Geoff Kirby - Quirky Astronomy

10 Aug—Summer Social

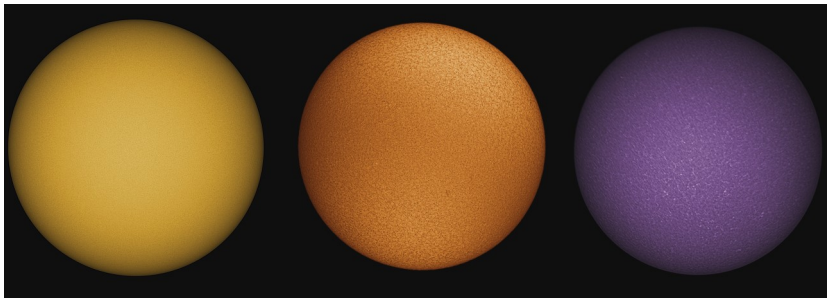
14 Sept—Open Evening / Viewing Evening

12 Oct—Barry FitzGerald - Lunar Geology from the safety of your own home

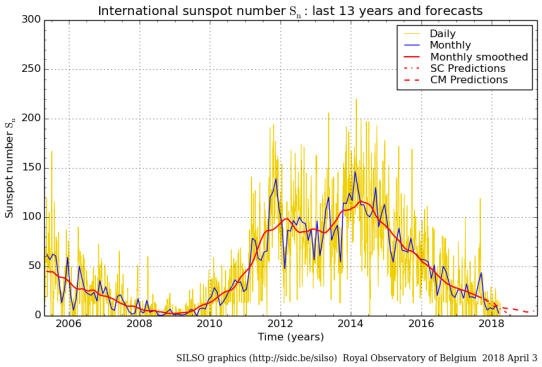
9 Nov—Sheri Karl - Gravity Waves

More to come!!

WAC News—



Another month of very quite solar activity. As of writing this, 2018 has had 61% of the days without sun-spots. Not only that, the solar activity in H-alpha and CalciumK has been anomalously low. I checked with the BAA Solar Section Director Lyn Smith who confirms this is the quietest that she has seen the sun as well. Even during previous solar minima, there were still active regions without sunspots present. Currently, the disk is showing very little in the way of activity at all. The trio above was taken on the 25 March. Images were again taken this week in April and still…. Blank. A check of SILSO the 'World Data Center for the production, preservation and dissemination of the international sunspot number' provides a sunspot forecast as shown in the graph. Something is definitely afoot! Until next month! ~SK



Measuring the Movement of Water on Earth by Teagan Wall

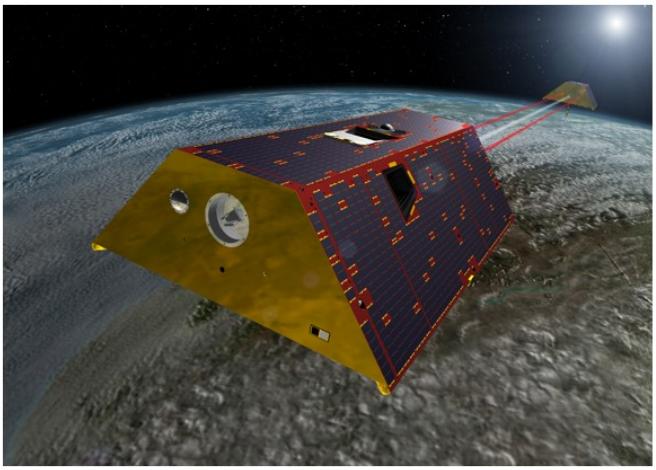
As far as we know, water is essential for every form of life. It's a simple molecule, and we know a lot about it. Water has two hydrogen atoms and one oxygen atom. It boils at 212° Fahrenheit (100° Celsius) and freezes at 32° Fahrenheit (0° Celsius). The Earth's surface is more than 70 percent covered in water.

On our planet, we find water at every stage: liquid, solid (ice), and gas (steam and vapor). Our bodies are mostly water. We use it to drink, bathe, clean, grow crops, make energy, and more. With everything it does, measuring where the water on Earth is, and how it moves, is no easy task.

The world's oceans, lakes, rivers and streams are water. However, there's also water frozen in the ice caps, glaciers, and icebergs. There's water held in the tiny spaces between rocks and soils deep underground. With so much water all over the planet—including some of it hidden where we can't see—NASA scientists have to get creative to study it all.

One way that NASA will measure where all that water is and how it moves, is by launching a set of spacecraft this spring called GRACE-FO.

GRACE-FO stands for the "Gravity Recovery and Climate Experiment Follow-on." "Follow-on" means it's the second satellite mission like this—a follow-up to the original GRACE mission. GRACE-FO will use two satellites. One satellite will be about 137 miles (220 km) behind the other as they orbit the Earth. As the



An artist's rendering of the twin GRACE-FO spacecraft in orbit around Earth. Credit: NASA

Water (*more!*)

satellites move, the gravity of the Earth will pull on them. Gravity isn't the same everywhere on Earth. Areas with more mass—like big mountains—have a stronger gravitational pull than areas with less mass. When the GRACE-FO satellites fly towards an area with stronger gravitational pull, the first satellite will be pulled a little faster. When the second GRACE-FO satellite reaches the stronger gravity area, it will be pulled faster, and catch up.

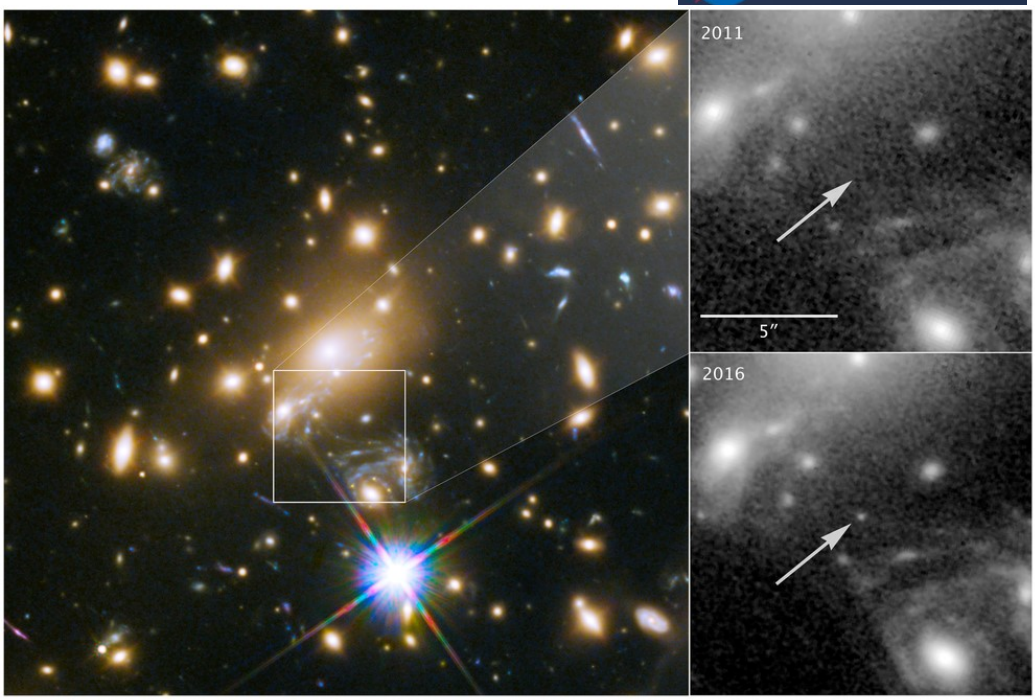
Scientists combine this distance between the two satellites with lots of other information to create a map of Earth's gravity field each month. The changes in that map will tell them how land and water move on our planet. For example, a melting glacier will have less water, and so less mass, as it melts. Less mass means less gravitational pull, so the GRACE-FO satellites will have less distance between them. That data can be used to help scientists figure out if the glacier is melting.

GRACE-FO will also be able to look at how Earth's overall weather changes from year to year. For example, the satellite can monitor certain regions to help us figure out how severe a drought is. These satellites will help us keep track of one of the most important things to all life on this planet: water.

Hubble uncovers the farthest star ever seen!

National Aeronautics and Space Administration

More than halfway across the universe, an enormous blue star nicknamed Icarus is the farthest individual star ever seen. Normally, it would be much too faint to view, even with the world's largest telescopes. But through a quirk of nature that tremendously amplifies the star's feeble glow, astronomers using NASA's Hubble Space Telescope were able to pinpoint this faraway star and set a new distance record. They also used Icarus to test one theory of dark matter, and to probe the make-up of a foreground galaxy cluster.



Icarus, whose official name is MACS J1149+2223 Lensed Star 1, is the farthest individual star ever seen. It is only visible because it is being magnified by the gravity of a massive galaxy cluster, located about 5 billion light-years from Earth. Called MACS J1149+2223, this cluster, shown at left, sits between Earth and the galaxy that contains the distant star. The panels at the right show the view in 2011, without Icarus visible, compared with the star's brightening in 2016.
Credits: NASA, ESA, and P. Kelly (University of Minnesota)

The star, harbored in a very distant spiral galaxy, is so far away that its light has taken 9 billion years to reach Earth. It appears to us as it did when the universe was about 30 percent of its current age.

The discovery of Icarus through gravitational lensing has initiated a new way for astronomers to study individual stars in distant galaxies. These observations provide a rare, detailed look at how stars evolve, especially the most luminous stars.

"This is the first time we're seeing a magnified, individual star," explained former University of California at Berkeley postdoc and study leader Patrick Kelly now of the University of Minnesota, Twin Cities. "You can see individual galaxies out there, but this star is at least 100 times farther away than the next individual star we can study, except for supernova explosions."

Gravity as a Natural Cosmic Lens

The cosmic quirk that makes this star visible is a phenomenon called "gravitational lensing." Gravity from a foreground, massive cluster of galaxies acts as a natural lens in space, bending and amplifying light. Sometimes light from a single background object appears as multiple images. The light can be highly magnified, making extremely faint and distant objects bright enough to see.

In the case of Icarus, a natural "magnifying glass" is created by a galaxy cluster called MACS J1149+2223. Located about 5 billion light-years from Earth, this massive cluster of galaxies sits between the Earth and the galaxy that contains the distant star. By combining the strength of this gravitational lens with Hubble's exquisite resolution and sensitivity, astronomers can see and study Icarus.

More can be found at https://www.nasa.gov/feature/goddard/2018/hubble-uncovers-the-farthest-star-ever-seen