

Kielder Observatory Newsletter



**Special
Education
Report**



NEWS

Meet our two new
team members.

NIGHT SKY

Highlights
Nov/Dec/Jan

OBSERVING

The Square of
Pegasus

AURORA

Becki Cooper has been to
Norway ...



EDITORIAL

I was out the other night and saw the familiar stars of Orion rising in the East. This is always a sign that the dark skies of Winter are on the way. This edition is formatted a little differently from usual, as we bring you a special report on our educational programme. We also travel to Norway with one of our Science Communicators, Becki Cooper, who took some stunning shots of the aurora.

Nigel Metcalfe

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newsletter@kielderobservatory.org

Kielder Observatory Astronomical Society

Registered Charity No: 1153570.

Patron: Sir Arnold Wolfendale 14th Astronomer Royal

Kielder Observatory Astronomical Society is a Charitable Incorporated Organisation.

Its aims are to

- * Promote interest in the science of astronomy to the general public
- * Facilitate education of members of the public in the science of astronomy
- * Maintain an astronomical observatory in Kielder Forest to support the above aims

<http://www.kielderobservatory.org>

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The Kielder Observatory Educational Programme



The Observatory is currently undertaking a major expansion into the world of education - above is our planetarium in action at Acklam Grange School, Middlesbrough. Moving into education is going to involve some re-organisation, but brings with it major opportunities. Here we take a look at our current work.

A while ago, KOAS submitted a funding bid to Transforming Tees in a desire to extend our educational offer by supporting improvements in science education in the Tees Valley. We are presently approximately half way through delivering the programme to schools across the Tees Valley split between Middlesbrough, Stockton, Redcar and Hartlepool to promote, inspire and enthuse Science Education across both

Primary and Secondary Schools. The project is led by Hartlepool Borough Council via the School Improvement Team.

Secondary Schools host the portable planetarium for 4 days and our Science team work with feeder primary schools to provide planetarium based inspirational sessions about discovering the universe. The team will also deliver to secondary school students in the planetarium to



KOAS NEWS

present Key Stage 3, GCSE and A Level content to help with their studies. The project expects to connect with a minimum of 20 secondary schools and around 80 primary schools. At least 100 teachers will be involved over the course of the two term project. Around 5000 students across the Tees Valley will experience the planetarium and be inspired.

A typical one hour session is split into two halves. This involves time spent inside the planetarium to cover space and astronomy content tailored for the student's year group. Following the planetarium show, the rest of the allotted time is spent with an interactive demo talk based on the Electromagnetic Spectrum. This involves the use of equipment such as an infrared camera and diffraction glasses, and again the delivery is tailored to fit the ability of the specific group. This delivery model was trialled at High Tunstall College of Science, Hartlepool and proved to be highly popular and then has been extended throughout the Tees Valley.

At the time of going to print, the secondary schools which have hosted include:

- Hillsview Academy, Middlesbrough
- Outwood Academy, Stockton

- Acklam Grange School, Middlesbrough
- Conyers School, Stockton
- Ian Ramsey Church of England School, Stockton

- Trinity Catholic College, Middlesbrough
- St Hild's Church of England School, Hartlepool

• Thornaby Academy, Stockton
with another nine Tees Valley Schools due to receive their Portable Planetarium Inspiration Experience before Easter 2019.

During these visits, students between the ages of 9 to 16 (Years 5 to 11) have been engaged in a number of activities including:

- experimenting with light and the electromagnetic spectrum using diffraction glasses and an infrared camera;
- learning about meteors and handling genuine meteorites from space;
- younger classes have experienced workshops where the pupils were tasked to design and construct their own spacecraft;
- and, of course, the primary focus has been the use of the inflatable planetarium. This involves exploring the night sky and the different constellations, visiting and learning about different planets inside the solar system or even exploring the larger universe with the GCSE students by flying



Late Night Dark Skies - November

"Very enthusiastic and knowledgeable. They are first rate communicators who did a great job in putting across complex facts in an entertaining and meaningful way. Highly recommended."

Brian - York

through the Hubble Ultra Deep Field.

Early Feedback from schools include:

- Students:

"I just wanted to say that I've really enjoyed this lesson. I've found it really interesting and definitely learned lots!"

At the end of a year 7 class, a student handed the presenter a note saying:

"We think you're very brainy and we really enjoyed it. Thank you."



Inside the planetarium

- Staff:

"Brilliant staff, great delivery, 100% spot on. Presentations were great, regardless of not being trained as teachers. Very engaging with the different age groups"

"It was the first time I've heard my Year 9 class say 'wow'!"

"The pupils all enjoyed the experience & our pupils who could not attend were disappointed to miss out on the experience. The Key Stage 3 and 4 pupils have learnt a lot from the show and have since been applying that knowledge in their lessons."

It is expected that after the Planetarium Visits, students will have a better understanding of 'space and astronomy' and will be inspired to better engage in science lessons and study science, physics and / or astronomy further into their schooling and beyond.

Adrian Brown

Adam Shore



OBSERVATORY NEWS



The interior of the Gillian Dickinson Academy - nice wood burning stove at the ready!

Since our last newsletter two new science communicators have joined the team, so you may well meet them if you come up to the observatory. Jesse Beaman has been working as a science communicator for over two months now, and has been really enjoying getting to know the team, observing using the equipment and, of course, delivering astronomy experiences with the public. Before joining us, Jesse ran a business in the Galloway Forest

Dark Sky Park, delivering stargazing and astrophotography tours and events under the name Stargazing Scotland. Jesse says "I'm looking forward to developing my role here, and to learning more about the Tees Valley educational programme which involves bringing an inflatable planetarium to schools in the area. In the future I also hope to learn to photograph objects such as galaxies and nebulae with the equipment here at the observatory."



OBSERVATORY NEWS

Also joining us is George Pattinson, who started working here at the beginning of October. He graduated in September from University College London with a Masters in Natural Sciences, where he majored in Astrophysics. Since then he has moved up to Newcastle (to be with his partner who is studying there). George says

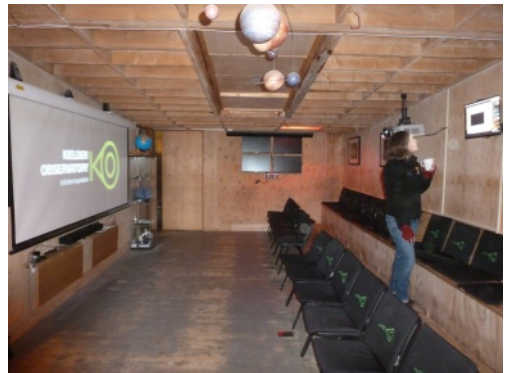


Inside the Sir Patrick Moore dome.

"When job hunting I was lucky enough to combine my love for outreach work and astronomy by applying, and then being welcomed, onto the Science Communication team at Kielder Observatory. I have really enjoyed my first

few weeks here, especially getting to meet the team and of course the clear nights! In November I am spending 3 weeks with a university friend in small communities in Sierra Leone, with a charity called Rory's Well. We are still yet to fully decide on a project to run, as this is part of the purpose of this first trip, however I am hoping it will be helping to plant and grow sustainable crop to be used as babyfeed to fight malnutrition in infants. (For more information please visit <http://www.roryswell.org/>)".

As well as these two appointments, our rapidly expanding educational programme means we are already on the lookout for another Science Communicator, which will bring our complement up to nine.



Becki prepares for the evening's action.



OBSERVATORY NEWS

Meanwhile, we are pleased to announce that planning permission has been granted for our small planetarium up at the observatory site. Fundraising has yet to start in earnest, but you should be hearing more about this over the coming months.

We have been on TV again recently. On August 10th we featured in Britain By Bike on Channel 5, in the episode about Northumbria. More recently, ITV Tyne Tees featured quite a lengthy item celebrating our 10th anniversary, which

https://www.youtube.com/watch?v=K_u7-SBBEol .

Our New Year's party is already sold out, and weekends for the rest of this year are filling up fast, but you can still get a place on our family friendly "Introduction to Astronomy" events. These start at 5pm (most days, but check the online calendar <https://kielderobservatory.org/our-events>) and are designed to inspire people of all ages with our fun and interactive learning experience.

TRUSTEE NOTES

With the rapidly expanding nature of the work of the observatory, the trustees have decided to expand the team. First in line has been the appointment of a parttime finance assistant - with turnover exceeding half a million pounds a year, we feel this is necessary step to ensure our finances are maintained in good order. As part of the expansion, we are also talking to the new North of Tyne Combined Authority with the aim of taking our educational offering into schools across Northumberland, Newcastle and North Tyneside to improve children's science skills.



Inside the Gillian Dickinson Academy

had interviews with both staff and visitors. You can view the item at





NIGHT SKY

Not been to Kielder Observatory yet?

Then why not book one of our events for you or your family?

Advanced booking is essential. Weekend events can fill up several weeks in advance. Please book online at <http://www.kielderobservatory.org/our-events/> or call us on 0191 265 5510. We can also be contacted at admin@kielderobservatory.org





NIGHT SKY

NOVEMBER 2018 (times in GMT)

Lunar phases

New Moon	07/11/2018	16:01
First quarter	15/11/2018	14:54
Full moon	23/11/2018	05:39
Last quarter	30/11/2018	00:18

PLANET SUMMARY

Mercury is not visible this month. Venus will be visible in the morning twilight. Mars is an evening object visible until around 2200. Jupiter is not visible this month. Saturn is not visible this month. Uranus is visible from dusk until around 0400.

THE STARS AT 8PM (GMT)

North – Cepheus is high overhead, with Draco and the two Bears nicely placed.

East – Cassiopeia and Andromeda are high up with Perseus nicely placed.

Taurus is near the horizon and to its top RHS is Aries.

South – Pegasus is nicely placed with Pisces. Aquarius is low down and you can find Formalhaut in Pisces Austrinus – a bright star that is the most southerly placed bright star we can see from the UK.

The Planets 15/11/2018

	Sun	Moon	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
Rise	07:36	13:44	09:51	05:00	13:50	08:23	11:15	15:09
Set	16:03	22:51	16:35	14:47	23:22	16:27	18:32	05:27

West – Cygnus dominates this view along with Sagitta, Vulpecula and Lyra. Low down you can find Hercules.

METEOR SHOWERS

November hosts two meteor showers:

1) Taurids – around the 1st to 6th of November – this is a short shower but the particles are quite 'large'.

2) Leonids – on the 16th, 17th and 18th of November – another annual shower that usually puts on a good show of 50 to 100 meteors every hour. These particles are fast moving and 'small' and so the meteors are quite faint. With a near first quarter Moon on these nights there is a fair chance to see the Leonids, after midnight once the Moon has set.

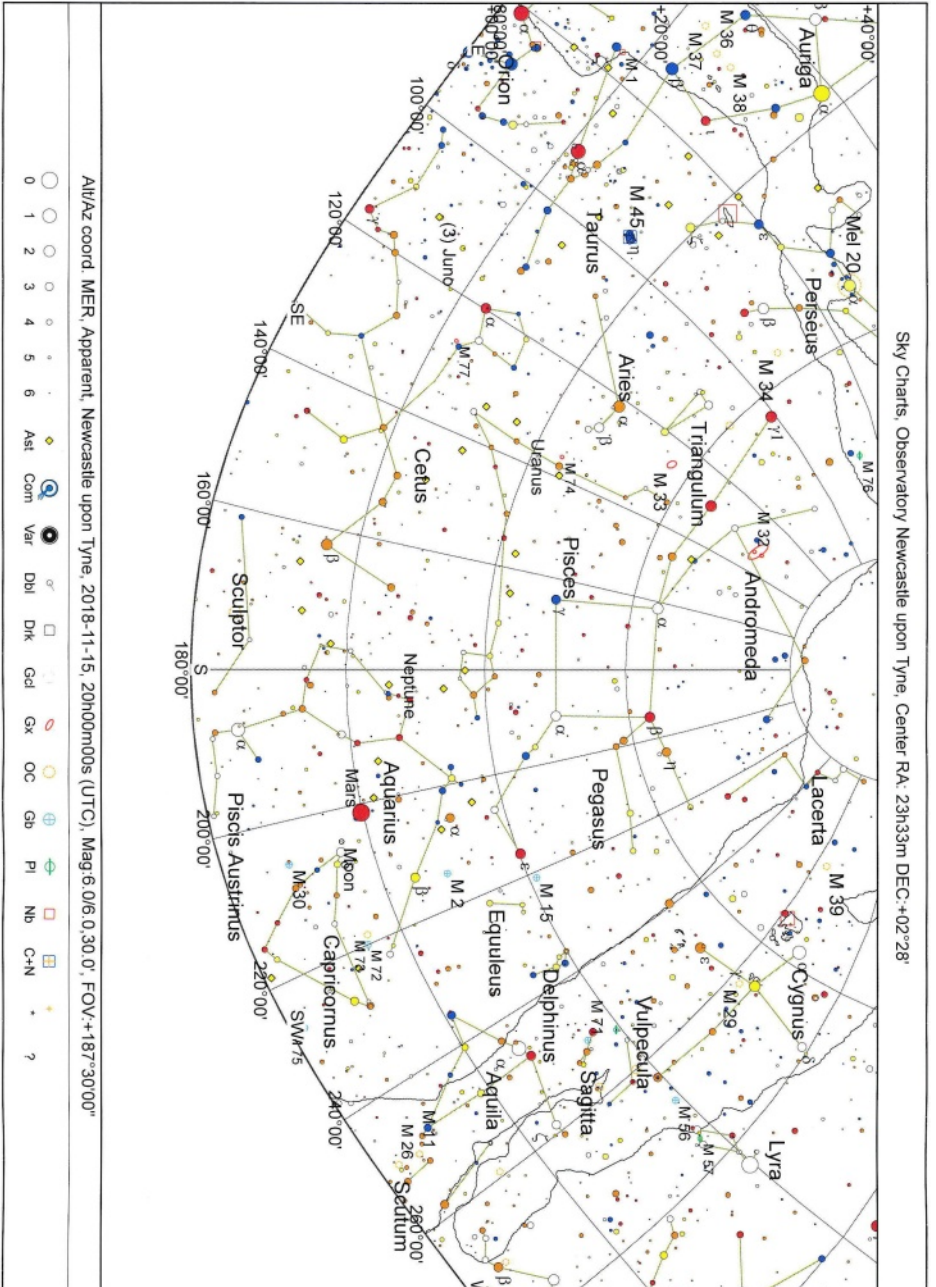
COMETS

Comet 46P/Wirtanen. is brightening during November at around magnitude 4. It will be very low in the south for most of the month. Comet 38P/Stephan-Oterma will be visible in Gemini at around magnitude 10 but brightening during the month. There are no other comets visible above magnitude 10.



NIGHT SKY

Sky Charts, Observatory Newcastle upon Tyne, Center RA: 23h33m DEC: +02°28'





NIGHT SKY

DECEMBER 2018 (times in GMT)

Lunar phases

New moon	07/12/2018	07:22
First quarter	15/12/2018	11:51
Full moon	22/12/2018	17:50
Last quarter	29/12/2018	09:36

PLANET SUMMARY

Mercury – near Western elongation is visible just before dawn. Venus is more prominent being visible for a few hours before dawn. Mars is an evening object low in the south after sunset and is visible until around 10pm. Jupiter will be a very difficult object visible low in the east before sunrise – close to Mercury. Saturn is not visible this month. Uranus is visible after sunset for many hours until about 0130.

THE STARS AT 8PM (GMT)

North – Cepheus is overhead, with the two bears nicely placed. Hercules is low in the NW and Cancer low in the NE.

East – Perseus is overhead, with Auriga nicely placed. Taurus, Gemini and Orion are well placed for observation.

South – Triangulum and Aries are

overhead. Pisces – with Uranus – and Cetus are nicely placed. Aquarius – with Mars and Neptune – are low down in the SW

West – Lacerta is overhead with Cygnus nicely placed for viewing. Pegasus is nicely placed in the SW. Hercules and Lyra are low in the SE.

METEOR SHOWERS

The main meteor shower of December is the Geminids which are visible on the night of the 13th/14th December with some activity a few days either side. In 2018, the Moon will be near first quarter and so will drown out the shooting stars until it sets at around midnight, so there is a window of opportunity from around 0100 until 0630 to view this shower in dark skies. Expect in the region of 30 meteors per hour. This shower is unusual in that it originates from an Asteroid – Phaethon. Later in the month – on Christmas Day the Ursids are active. Expect up to 5 per hours from this weak shower. It will be visible all night and will be hampered by a waning gibbous Moon drowning out all but the brightest particles from this shower.

The Planets 15/12/2018

	Sun	Moon	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
Rise	08:22	12:49	06:19	04:01	12:14	07:03	09:30	13:10
Set	15:37	23:56	14:43	13:54	23:23	14:47	16:49	03:24



NIGHT SKY

COMETS

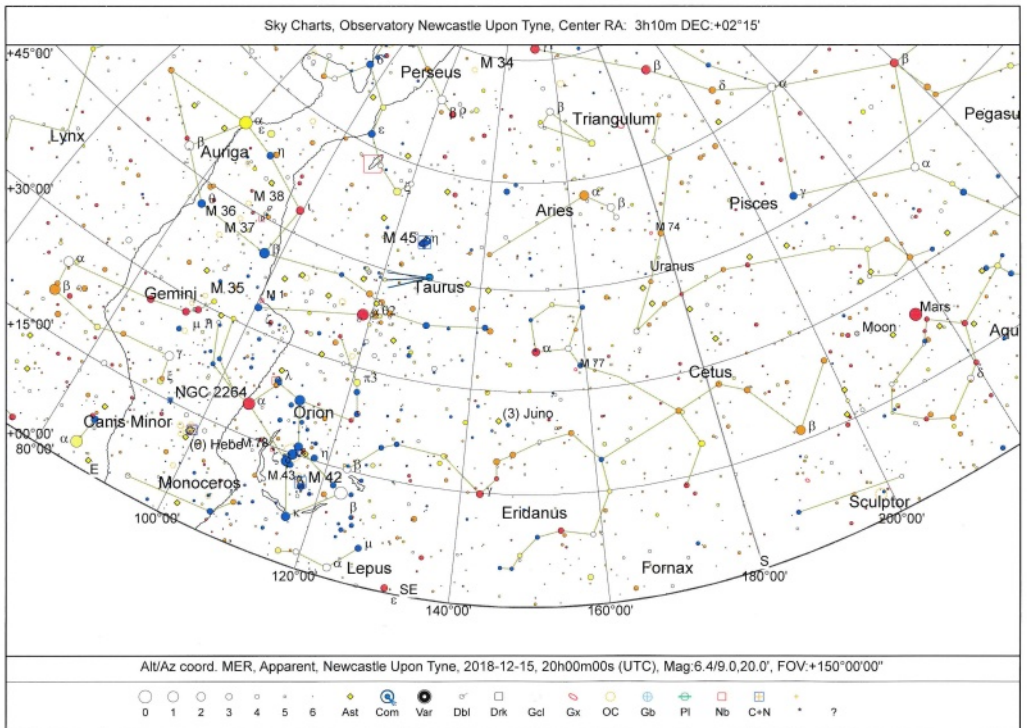
Comet 46P/Wirtanen will be near peak brightness at magnitude 4.5 during the month of December. It will be visible during the second half of the month as it transits through the constellation of Taurus and Auriga

Comet 38P/Stephan-Oterma will be visible in the constellation of Gemini at magnitude 10 as it swings close to Pollux on 1st December heading in the direction of the constellation of Lynx later in the month.

A Universe Full Of Stars - October

"Absolutely fantastic event, worth every penny. I suppose it really does depend on the cloud cover but we were very lucky and the milky way was an amazing site! Will never forget it. The staff were highly knowledgeable and friendly, very easy to approach. Plus the hot chocolate was amazing, will treasure our mugs"

Thomas
Loughborough





NIGHT SKY

JANUARY 2018 (times in GMT)

Lunar phases

New moon	06/01/2019	01:30
First quarter	14/01/2019	16:47
Full moon	21/01/2019	05:17
Last quarter	27/01/2019	21:12

PLANET SUMMARY

Mercury is in conjunction with the Sun and not visible this month. Venus will be visible in the morning sky for about 2 hours before dawn. Mars is an evening object visible for about 3 hours after sunset. Jupiter is not visible this month. Saturn is in conjunction with the Sun. Uranus is an evening object visible until around 11pm.

THE STARS AT 8PM (GMT)

North – Draco is prominent splitting up the two Bears. Hercules is low in the NNE. Cepheus is nicely placed in the NW with Cygnus just below it.
East – Auriga is overhead with Gemini nicely placed. Orion is prominent in the NE with Lepus – the Hare, Monoceros the Unicorn and Canis Major – and Minor – beginning to show themselves again.

South – Taurus and Orion are well placed for observing. Eridanus and Cetus are low down. Aries and Pisces are high up in the SW.

West – Andromeda is overhead with Lacerta just below it. Pegasus and Cygnus are well placed as is Pisces – with Mars.

METEOR SHOWERS

The major meteor shower of this month are the Quadrantids on the 4th January. Muralis Quadrans was a constellation introduced in the early 17th century, but as the use of the quadrant circle diminished it was absorbed back into Bootes.

The Quadrantids meteors shower is a very short – sharp – peak of very bright and often colourful shooting stars. It may only last for a few hours but if you catch a Quadrantid fireball then it will be worth the wait.

The [nearly New] Moon will have set before the sky gets dark so 2019 should be an excellent year to view this very

The Planets 15/01/2019

	Sun	Moon	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
Rise	08:21	12:06	08:08	04:44	10:36	05:35	07:41	11:08
Set	16:10	01:10	15:04	13:07	23:37	13:06	15:05	01:21



NIGHT SKY

shower. These particles can be both bright and colourful but the shower may only last a few hours around midnight on the 3rd or 4th January.

Night Sky credits:

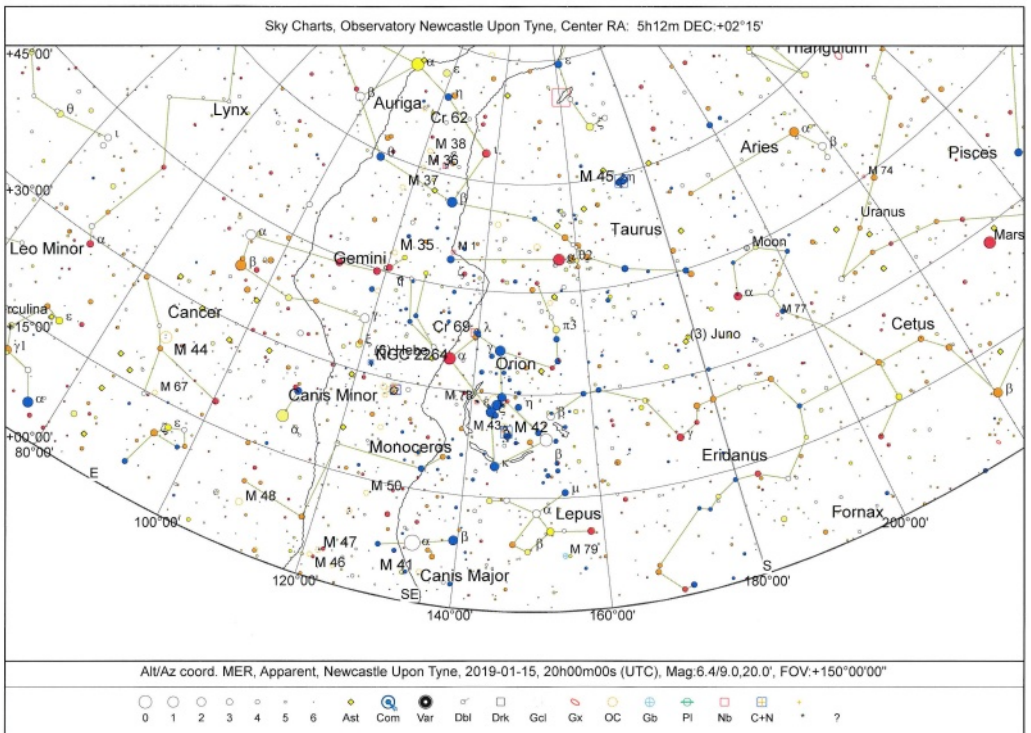
Data sourced from Cybersky 5,

<https://www.timeanddate.com/moon/phases/>

and <https://in-the-sky.org/>.

COMETS

Comet 46P/Wirtanen will be near peak brightness at magnitude 4.5 during the month of January. It will be visible during the second half of the month as it transits through the constellation of Ursa Major – near the 'head' of the Bear.





OBSERVERS' SLOT

The Constellation of Pegasus

High in the sky at this time of year is the constellation of Pegasus, the winged horse (I have to say you need a good imagination to make that out! - ed.). Its main outline is that of a square, the Great Square of Pegasus in fact, formed of the four 2nd magnitude stars Markab (bottom right), Scheat (top right), Algenib (bottom left) and Alpheratz (top left, and actually in Andromeda). How many stars you can pick out inside the square with your naked eye is a well-known test of how dark your skies are. From a light-polluted site you will be lucky to see more than a couple, but with a really exceptional dark sky (and good eyesight) you might see 20-30 or

more. If you are lucky enough to get a clear sky up at Kielder, see how many you can count.

The only Messier object in Pegasus is the splendid globular cluster M15. Easy to see with binoculars, it lies to the extreme west of the constellation, near the star Enif (the horse's head).

The square is actually home to quite a few galaxies, but most need a good telescope or a camera to see them. However there are actually three Caldwell objects (from the list compiled by Sir Patrick Moore as a complement to the Messier catalogue), all of which are galaxies:



The globular cluster Messier 15 is one of the finest in the northern sky, and has been known about since 1746. A member of our Milky Way galaxy, it consists of about 100,000 stars.

Credit: N. Metcalfe



OBSERVERS' SLOT

C30, otherwise known as NGC7331, or the Deer Lick Group, as there are several fainter galaxies around it, is the brightest of the trio. How this didn't make Messier's catalogue is something of a mystery, as it



NGC7331 and friends.

Credit: N. Metcalfe

is brighter than several of the Messier galaxies, and can be seen in binoculars from a dark site. It is a spiral, seen nearly, but not quite, edge-on, and lies 40 million light-years away.

Next is C43 (NGC7814). This is seen edge-on, and has a dark dust lane right across the middle, not unlike the Sombrero galaxy, Messier 104, in Virgo (although it is considerably fainter). It is thought to be at a similar distance to C30. Finally we have C44 (NGC7479). This a splendid face-on example of what is known as a barred spiral galaxy. It is the furthest away of our three Caldwell objects at about 100 million light-years. We should also perhaps mention the



Barred spiral galaxy NGC7479

Credit: Pan-STARRS

famous Stephan's Quintet, a group of more distant galaxies which appear to be interacting. Actually, one of the galaxies is in the foreground (the blue spiral in the image), at a similar distance to C30. The others really are interacting, but are much further away (around 300 million light-years).



Stephan's Quintet. The bluest galaxy is really in the foreground.

Credit: Pan-STARRS



ASTRONOMERS' TALES

Becki goes to Norway ...

Kielder's own Science Communicator, Becki Cooper, reports back from her recent trip to Norway ...



Aurora campfire between Tromvik and Vengsøya.

I recently got the opportunity to visit Tromsø, Norway, to see the Northern Lights. We are sometimes lucky enough to see the aurora from the dark skies of Kielder; usually we can catch a glimpse a few times a year or more. The arctic circle however sits right under the northern auroral oval of the Earth and so sightings are much more frequent and the displays are more likely dramatic. I am not the

most gifted photographer of the staff, but armed with my new F2.8 14mm lens, the Observatory's 5D camera, and a tripod, I headed out. The camera was most of the luggage.

Clouds always being the enemy, I stayed for 6 days to hedge my bets. And clouds did indeed materialise some nights, however some clear patches came through too and 3 nights did not



ASTRONOMERS' TALES

disappoint. One of the evenings, the best forecast night, we decided to take a trip to the coastline of the island just north west of Tromsø. We positioned ourselves on a dark beach with a view point between the tiny hamlet of Tromvik and the island of Vengsøya. With patience, beautiful structures emerged as the night progressed - arcing, curtains, folding ribbons, and some 'corona/crown' shapes (where the aurora is coming down on you from above and the activity resembles sort of needles descending from straight up).

Occasionally the motion was so fast it looked time lapsed. Even later on, taking simple constellation images in the south, the sky was green in the background instead of blue.

Tromsø itself is a small city with people visiting year round, even in summer for the midnight sun. It is surrounded by some mountains and larch woodland. The main part of the settlement is on an island with some people on the neighbouring mainland. At night, the place is lit up brightly with street lights - even around



Folded ribbon between Tromvik and Vengsøya



ASTRONOMERS' TALES

residential districts. Many people have multiple lights all the way around the outside of their houses. One of the reasons we were given for this is a Norwegian folklore about trolls stealing children away from dark unlit houses. Of course, to star-gaze or aurora-gaze, darkness is best. We found a good bit of dark woodland next to a lake not too far away.

The aurora is the atmosphere glowing thanks to the tenuous outer atmosphere of the sun and Earth's magnetic field.

There are four different colours possible

however green is the one most often associated with aurora. Reds, pinks, and blues can also be produced. Often, however, these colours are fainter or subtler than most people expect from images if they have never seen it before.

To the eye, it can seem like a whitish light, with tinges of colour if it kicks off. The camera will always accentuate, or bring out, more colour. There is also a southern-hemisphere equivalent - the Aurora Australis - around the south magnetic pole of the Earth.

If you are keen to track maybe-British



Lights over Vengsøya



ASTRONOMERS' TALES



Lights over Prestvannet lake, Tromsø.



ASTRONOMERS' TALES

-viewable auroral activity, at Kielder we often use www.spaceweather.com. If you are planning a trip north to see the lights, I planned my visit around the Moon and the equinox - the equinoxes, which are about March 21 and September 21 every year, seem to be particularly conducive to aurora and the lunar light pollution can be problematic during or near full moon. So, I picked the new moon after the autumn equinox. If you would like to be temporarily transported to northern Norway from your desk right now, this is an all-sky camera which updates every minute when it is dark from Skibotn Observatory, on the mainland bit of Tromsø: <http://fox.phys.uit.no/ASC/ASC01.html>



Becki Cooper

Aurora Night - November

"Excellent - all of the team were extremely friendly, helpful, enthusiastic, knowledgeable and informative. Cannot be faulted. Really enjoyed the event, especially as we were fortunate to be blessed with such stunning clear skies. Hope to visit again soon with our children also & will recommend the observatory to all. Thank you!"

Derek
Newcastle

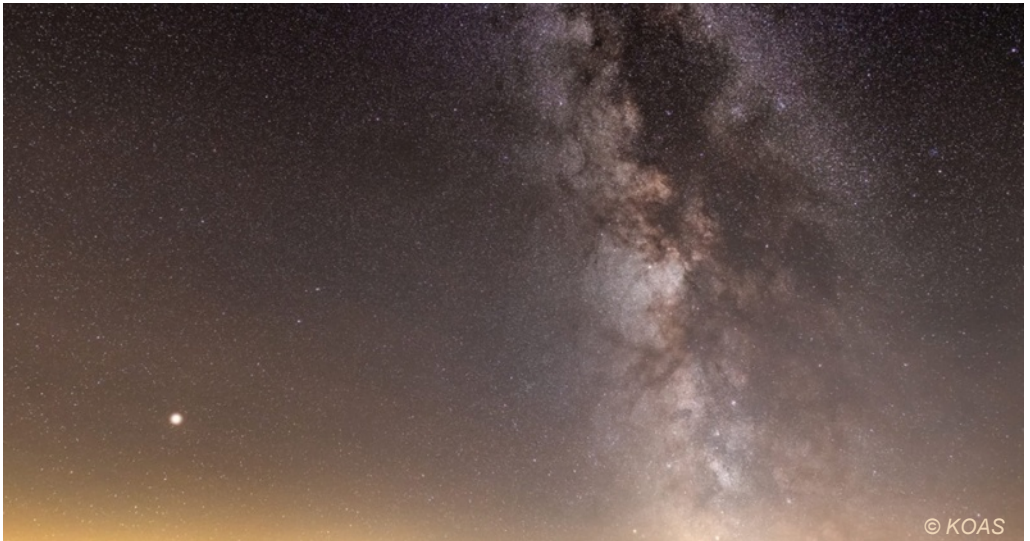


GALLERY

We would love to display your images here, whether they are taken up at Kielder or not - please send them to

newsletter@kielderobservatory.org

along with a brief description of how and when they were taken.



© KOAS

The planet Mars (bottom left) and the Milky Way taken at the Observatory on a clear night in October.



© KOAS

The Andromeda Galaxy, Messier 31, photographed by one of the team recently. Andromeda is the nearest galaxy to our own in the Universe and actually visible with the naked eye from the dark skies above the Observatory.



GALLERY

Family Astronomy - November

"All the staff were excellent. No weak links! Answered questions at the level of the kids, made it feel really friendly and approachable by encouraging questions. All the kids (11-13) came out excited about what they had learnt, the experiment they had done. They even explained the relative speeds to me at breakfast the next day- I am still confused about the fact we are moving so quick on the earth's surface."

Helen - Northumberland



A composite shot of the moon rising taken by one of the observatory staff, Dan Monk.



GALLERY



The thin cloud highlights this shot of the Milky Way from the Observatory quite nicely. This was taken back at the beginning of September. The bright object in the bottom left is Mars.

Reader Duncan Hale-Sutton from Norfolk sent in this 8 min exposure of the Ring Nebula (Messier 57) in Lyra. It was taken with a Nikon D90 through a 140mm Maksutov Cassegrain telescope.





GALLERY

A beautiful shot of the Orion Nebula (Messier 42) taken by one of the Science team at the beginning of November. This is a birth place for new stars, and one of the best objects for budding astrophotographers to start practising their skills on.



© KOAS



Lurking at the other end of that arm is our very own Operations Manger John Holmes. I think we know where he took his holidays this year!



GALLERY



© KOAS

Back in September again. This spectacular shot was taken by our Science team from the edge of Kielder reservoir.



"Went for an astrophotography evening with my son. Despite the initial grey weather the staff gave some useful advice, knowledgeable chats and showed some wonderful shots and film from Hubble. Also took us to see the high powered telescopes they use. Later as the weather cleared we went outside to see and photograph the night sky. The staff used lasers to point out planets and constellations and helped attendees to set their cameras correctly. A very informative and enjoyable evening."

Mark - Sheffield

KOAS: Your Window to the Universe

<http://www.kielderobservatory.org>

**KIELDER
OBSERVATORY**

Infinite Inspiration

