



WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society

Official website: www.was.org.uk

Affiliated websites: www.observatory99.freeserve.co.uk



Number 147

November 2001

ALMANAC

All times U.T. for B.S.T. add one hour.

Nov./ Dec. LUNAR

Month	Date	Time	rise	set
November	Full Moon	1st	05.41	17.02
	Last Quarter	8th	12.21	22.54
	New moon	15th	06.40	07.15
	First Quarter	22nd	23.21	13.26
	Full Moon	30th	20.49	15.53
December	Last Quarter	7th	19.52	23.28
	New moon	14th	20.47	07.29
	First Quarter	22nd	20.56	12.24
	Full Moon	30th	10.40	15.56

21st	21	Mars 2° N. of moon
December		
1st	02	Saturn 0.5° S. of moon
3rd	11	Jupiter 2° S. of moon
3rd	14	Saturn at opposition
4th	22	Mercury in superior conjunction
7th	04	Pluto in conjunction
14th	06	Venus 0.8° S. of moon
14th	21	Annular eclipse, central America
15th	08	Mercury 2° S. of moon

EARTH

Month	Sunrise	Sunset
November	1st	06.54
	8th	07.06
	15th	07.18
	22nd	07.30
	30th	07.42
December	7th	07.51
	14th	07.59
	22nd	08.04
	30th	08.06

Minima of Algol				
Nov	17th	02.36	19th	23.24
	22nd	20.12	25th	17.00
Dec	4th	07.30	7th	04.18
	10th	01.06	12th	21.54
	15th	18.42		

Lunar Occultations

Times as at W.A.S. Observatory				
Date	U.T.	S.A.O.No	Mag	Phase
Nov	h. m. s.			
19th	18.22.44	188326	5.6	diss
25th	22.30.08	128787	6.9	diss
27th	00.53.17	109795	7.6	diss
27th	18.49.13	110228	7.6	diss
27th	21.57.00	110268	7.4	diss
28th	01.24.07	110325	6.4	diss
28th	18.17.44	93067	6.3	diss
Dec				
1st	20.44.11	77184	4.9	reapp
1st	22.34.48	77220	6.3	reapp
2nd	04.36.23	77420	6.4	reapp
2nd	20.04.12	78349	6.1	reapp
3rd	01.57.02	78568	6.8	reapp
3rd	03.13.58	78610	7.4	reapp
3rd	05.53.23	78707	7.2	reapp
4th	04.29.17	79657	7.4	reapp
4th	04.51.26	79663	7.5	reapp
4th	06.30.09	79704	6.3	reapp
5th	03.00.10	80378	4.7	reapp
6th	23.38.44	99172	5.4	reapp
7th	01.35.04	99202	7.8	reapp
7th	07.12.11	99280	6.9	reapp
8th	03.40.04	118922	8.5	reapp
9th	06.51.05	119447	7.6	reapp
10th	06.40.37	139311	8.4	reapp

This is only about 20% of the predictions for the W.A.S. Observatory.

Please note the change to **Smithsonian Astrophysical Observatory** star catalog = S.A.O. I hope this will be of more use to members

PLANETS

(As at November 30th.)

Planet	Constellation	Rises	Sets	Mag.
Mercury	Scorpius	07.32	15.47	-1.0
Unfavourable				
Venus	Libra	06.40	15.31	-3.9
Brilliant morning object in East				
Mars	Capricornus	12.23	21.59	+0.4
Visible in the Southwest				
Jupiter	Gemini	18.18	10.34	-2.7
Visible most of the night				
Saturn	Taurus	16.13	07.59	-0.3
Visible most of the night				
Uranus	Capricornus	12.13	21.45	+5.8
Becoming unfavourable				
Neptune	Capricornus	11.33	20.25	+8.0
Becoming unfavourable				
Pluto	Ophiuchus	07.25	17.21	+13.9
Unfavourable				

PHENOMENA

Day	Hour	November
14th	03	Venus 3° S. of moon
14th	09	Mercury 2° S. of moon
17th	**	Leonid meteor shower. 17th/18th
18th		** Radiant rises about 22.00

Planetary Report

Glen Thomas

Mercury is very close to the crescent **Moon** on the morning of the 14th, but will soon disappear into the dawn glare, reaching superior conjunction on 3rd Dec.

Venus is a useful marker around the 14th, only 3 degrees above and to the right of Mercury. You will need a clear SE horizon though, with the group only 7 degrees above the horizon at 6:50 am.

Mars is now receding and fading to magnitude 0.5 in early December as the apparent diameter drops to 7". At an altitude of only 19 degrees it is difficult to see any features other than the phase, now distinctly gibbous, due to atmospheric distortions and a global dust storm.

Jupiter and **Saturn** are both visible all night, Jupiter in Gemini and Saturn in Taurus near Aldebaran. Saturn's rings have now opened up to extend beyond both poles. To see the best detail with a telescope, wait until the giant planets have risen above an altitude of 30 degrees, avoiding the worst of the atmospheric turbulence. **Saturn** will be occulted by the Full Moon at 02:25 on the morning of Dec 1st, reappearing at 03:30. The planet will take about 90 seconds to disappear or reappear.

Uranus and **Neptune** are binocular objects in Capricornus, but are already heading into the SW sky before the sky is dark, and will be lost in the twilight later in the month.

Pluto is not suitably placed this month.

The asteroid **4Vesta** is a bright binocular object, just below naked eye visibility, moving through the southern fringes of the Hyades in Taurus. It passes one and a half degrees south of Gamma Tauri as it approaches opposition on the 28th. To identify, sketch the eyepiece view on two different occasions. The asteroid will be revealed by its motion against the stars.

Editors Note

Well hello all, for those of you who missed the meeting last month here is a chance to catch up with all the exciting events surrounding the AGM, scan the following pages to be updated on all that's new in the world of WAS.

Partly because a change is as good as a rest, but mostly to keep you all on the back foot, over the next 2 months WAS News will undergo various changes in size. This is a trial measure undertaken solely to see if members would prefer either a compact or gatefold version of the

newsletter. Feed back please! Write, email or shout at me during the next meeting.

Rob

Worthing Astronomical Society – AGM

New Line up

Executive Committee

Chairman	Brian Hall
Secretary	Post Vacant
Treasurer	Mike Marshall
Vice Chairman	Bob Turner
Assistant Secretary	David Chiland

Other Posts

Curator	Graham Boots
WAS News Editor	Rob Davis
Auditor	Dave 'Doc' Sutton
Librarian	Vanessa Wegner
Web Site Manager	Ryan Thomas
Evening Class	Kelvan Gale
Refreshments	Kay Smith

Section Directors

Astronautics	Nick Quinn
Astrophotography	Alex Vincent
Comets	Alex Vincent
Variable Stars	Alex Vincent
CFDS	Pam Spence
Deep Sky	Graham Boots
History	Dee Levers
Instruments	Bob Turner
Lunar	Glen Thomas
Planets	Glen Thomas
Solar	Brian Halls

Chairman & Secretary's Report

Any form of healthy society is the sum of its own parts. Our Society is no different. Like an iceberg, there is a lot of work done by members that goes on unseen by the rest of the Society and I would like to take this opportunity to thank those who help the machinery of the Society running, so the rest of us can enjoy what goes on.

Due to the sudden resignation of our secretary Robert Kasproicz, due to personal reasons, the work of the secretary has been divided up between members of the

Executive Committee. I would like to take this opportunity to thank Robert for all his past work and thanks also for passing on the responsibilities of the job so well organised – having arranged speakers for several months in advance for example. I am pleased that Robert is still playing a very important role in the running of the Society; he is responsible for the distribution of WASNews, an important and vital task in the way the Society is able to keep in contact with its membership.

I would also like to say a thank you to my other colleagues on the Committee – Graham Boots and Bob Turner who have shared some of the workload of Secretary. Mike Marshall has, as you shall read in a moment, done a fantastic job of Treasurer, keeping all the bits and pieces balanced. I would also like to thank Dave Sutton for auditing the books.

I would like to thank my predecessor Dr David Storey for his help and advice in the early months at the beginning of my term of office.

Our meetings would not be complete without the customary tea break between the first half of the meeting and the second part. It goes without saying, that we all appreciate the work of Kay Smith and her team of volunteers, especially Joe Bradshaw, who sort out the refreshments and the clearing up after.

The production of the monthly newsletter is more than just the job of putting it all together – a task done very well by its editor, Rob Davis. The newsletter has to be reproduced, collated and stapled together. This job has been done by three members over the last year; by Vanessa our Librarian and myself when Vanessa had a change of job. With a change of employment for myself, I was no longer able to do the job, but it is now ably done by Graham Darlington – another important job that allows the members to keep in contact with the Society.

The Society has been quite active in astronomy; I have learnt that many members actually get their telescopes out and look at various things. The rest of the Society might not learn about it, but from what members tell me, I am pleased to hear news like that, so I know that we are doing something right!

During the last year there have been some changes – our monthly newsletter, WASNews is now distributed electronically via the Internet to those who want it in that format – if you have an email address you can get the newsletter delivered directly to your mailbox. Nick Quinn who for several years has been responsible for the Society's presence on the World Wide Web – handed the job of looking after the Society web pages to Ryan Thomas. So a thank you to Nick for keeping it

going. Ryan has done a good job of continuing the job and if any one gets a chance to look at the website he is managing please go there and importantly, let him know what you think – Ryan is in need of feed back from people, so we can give any newcomers visiting it a good idea of what we are all about.

The section directors are still quite active in stimulating interest in their particular branches of observing. Glen Thomas has recently become responsible for the planetary section – a section that has had little interest shown in it over the last several years – I am sure that this will now change.

The Society has had a mix of speakers over the last year – the AGM was unusual in that our speaker who was scheduled to speak to us in September could not attend due to the adverse weather and so spoke to us at the October meeting on the subject of near earth objects and possible collision of asteroids with the Earth. The new president of the BAA, Guy Hurst spoke to us in November on the subject of the amateur contribution to astronomy. We have had three speakers from Sussex University talking on a variety of subjects. Dr John Mason on the subject of the new south downs planetarium, and speakers from within our own Society. It is always difficult to predict what the future has in store for us – though we can all have an educated guess. The coming year sees on going explorations of Mars and we await the Cassini mission arrival at Saturn. There are of course other non-predictable astronomical events – bright comets and aurora are events that can occur with little notice.

Whatever the future holds in astronomy, Worthing Astronomical Society will be here reporting it the most important people – you, the members.

Thank you.

Dates for your Diary

Astro-photographic Evening

Alex Vincent

On Monday evening, November 19, I will at Hill Barn Golf Club Car Park between 20.00 to 22.00hrs, hoping to photograph Jupiter, Saturn, variable stars and (hopefully) some Leonids.

Bring a camera, a tripod (or some form of camera support), some warm clothing and a flask of something warm to drink.

Lunar & Planetary Photographic Evenings at the Observatory

Graham L. Boots - Curator of the Observatory

Those wishing to undertake photography of the Moon, Saturn and Jupiter please come to the Observatory (weather permitting) around 7.00 p.m. on any of the dates listed below. The Celestron 8 f10 Schmidt/Cassegrain will be in use at prime focus and eyepiece projection method with and without filters. Speed of film (not supplied) can be anything between 50 and 400 ISO colour or black and white. Many adapters are available for your own single lens reflex camera. I regret automatic cameras are not suitable but we are able to supply SLRs on site. If in doubt about the weather/seeing conditions please telephone 01903 505346.

November

Tuesday 27th November 11 day old Moon
Wednesday 28th November 12 day old Moon
Moon is high in the southeast

December

Friday 21st December 6 day old Moon
Saturday 22nd December 7 day old Moon
Moon in western sky

Cancelled Observer's Nights

Graham L. Boots - Curator of the Observatory

Due to holidays there will be no observer's nights at the Observatory on the following Fridays.

7th December

14th December

Alex Vincent hopes to arrange a viewing party at our Hill Barn, Worthing, observing site, which has a very dark northern sky.

Weather willing it will be on Friday the 14th to observe the Geminid meteor shower, which is at maximum activity around that date.

The zenith hourly rate is put at 100. There is normally many bright, slow and colourful shooting stars. The moonlight will not interfere this year.

The Geminids

Alex Vincent

I am organising group observing sessions at Hill Barn golf course car park over a series of evenings.

The Geminids meteor shower peaks every December and there are slow bright fireballs looking like illuminated light bulbs falling from the night sky. The maximum this year occurs on December 13th at 10.00 p.m. and the zenithal hourly rate (ZHR) is 100. Also this year, there will be no interference by the Moon as it is new at the time.

I am doing some observing and astrophotographic sessions for the Geminids at Hill Barn Golf Course on the nights of December the 13th, 14th and 15th and hope we have clear skies. We meet in the car park at 8.00 p.m. and bring along a camera and tripod, 400 ISO film recommended. I will supply report forms. The Observer's Night on Friday the 14th will be at Hill Barn and not the Observatory as Graham will be away.

Comet C/2000 WM1 (Linear)

Alex Vincent

Date	Ra		Dec		Mag.
	hr	Min	Deg	arc-Min	
14.11.01	03	39.4	+42	32	7.0
18.11.01	03	14.9	+37	53	6.4
22.11.01	02	46.6	+30	59	5.9
26.11.01	02	15.1	+21	10	5.4
30.11.01	01	41.9	+08	27	5.0
04.12.01	01	08.6	-05	40	4.7
08.12.01	00	36.8	-18	44	4.6
12.12.01	00	07.3	-29	13	4.6

The above coordinates are for Epoch 2000.0.

The Comet will be bright during the Months of November & December and goes through the constellations of Perseus, Aries, Pisces and Cetus.

It will be very close to the star Diphda (Beta Ceti) on the nights of the 7th & 8th of December. The comet becomes to low for observation by the middle of December when it is best seen from the southern hemisphere and reaches Perihelion on the 22nd January 2002.

The comet will again be visible in our skies by the middle of February when it will be of the 6th magnitude.

Reports

Solar Section Report - October, 2001

By Section Director, Brian Halls

Once again, sunspot activity has proved to be high during the month.

The month began 'quietly' with only a few groups visible on the solar disk, though one such group (9591 S20⁰ L=287⁰ area/type 0400 Fko) was a large naked eye object.

More sunspot groups appeared by the end of the first week with two such groups being of large naked-eye proportions. This general trend carried on for much of October – many of these large groups were magnetically complex regions and the Sun is in constant turmoil within these chaotic magnetic complex. The results of this are flares that can trigger disturbances in the solar atmosphere (the *corona*) and resulting *coronal mass ejections* (CME).

Through the month, there were 4 aurora alerts issued by the *Sky & Telescope* e-mail service; aurora caused as a result some of the sunspot groups crossing the solar disk at the time. One such alert (from the Space Weather News service) appears below:

AURORAS: An interplanetary shock wave, spawned by a solar explosion last Friday, swept past Earth on October 21st at approximately 1645 UT. A geomagnetic storm is underway, and sky watchers (especially those living at high latitudes) should remain alert for auroras. Usually the best time to spot Northern (or Southern) Lights is around local midnight.

The solar wind shock wave that buffeted Earth's magnetosphere today could be just the first of two heading for our planet. If so, the ongoing storm could intensify when the second arrives later today (Oct. 21) or tomorrow (Oct 22).

Space Weather News for October 21, 2001
<http://www.spaceweather.com>

There are reports of one such storm having caused aurora visible from the south coast – did any members observe it?

The incidence of aurora appears to coincide with the passing of maximum in the sunspot cycle

The month concluded the way it began, with large active groups on the face of the Sun.

The Sun was observed on 21 days in October. Observations from Graham Boots, Nick Quinn and the director. The Worthing AS Mean Daily Frequency (MDF) of active sunspot groups was 8.72; the relative sunspot number was 184.52.

October Lecture Reviewed - Report by H. Jampton

The Maunder Minimum Mystery

Brian began by explaining that our Sun is considered a normal and rather insignificant star born it is believed via the accretion method billions of years ago.

Life on Earth would not exist without it – we all enjoy sunlight and have become used to the Sun being a stable element in the process of our lives even though it occasionally goes through periods of turmoil which result ultimately in aurora being visible in our night skies.

But there could be a possibility that the Sun is not as stable as we have been led to believe and, that it may undergo changes in periods that are measured in decades rather than in millions or thousands of years.

First noted by Ernest Maunder, the Sun underwent a period of low sunspot activity during 1645 – 1715. This was not some sort of anomaly caused by astronomers either not observing or recording sunspot activity. The logbooks from Greenwich and Paris Observatories show astronomers during this time period being highly excited when sunspots were seen on the disk of the Sun.

Dr John Eddy named the sunspot famine period, **The Maunder Minimum** in 1976 and he has uncovered other periods of sunspot shortages over the last 1000 years.

These minima in sunspot activity coincide with periods known as the 'Little Ice Ages' – periods of extreme cold which resulted in the freezing up of some of the most famous rivers in northern Europe, including the Thames during the month of June!

Brian went on to explain the most recent research that leads astronomers and some climateologists to suspect the Sun as the source of global warming, rather than just the formation of greenhouse gasses.

The Sun underwent a period of extreme activity beginning in 1980, which also coincided with the shortening of the sunspot cycle from the normal 11-years. The accumulating effect of the violently active Sun and the shorter period between one sunspot maximum and the

next. It is this effect that is thought to be the root of the present period of global warming.

Indeed, the Earth is now cooler than it was at the start of the last millennium in 1000 CE!

Brian concluded the talk by explaining the recent estimates and predictions that show the present 'global warming' period coming to a finish within the next 10 to 20 years.

Notices

Aurora Alert

Brian Halls

The Aurora Alert List is to be updated – if you would like to be advised of any interesting astronomical phenomena or discovery quickly, you can have your name on a telephone list – there are two categories; those who don't mind being called at anytime and those who indicate the latest time they would like to be called.

If you are interested – please let me know by telephone or e-mail as soon as possible, so the new Alert List can be put into force at time of the December meeting.

SAGAS

Brian Halls

I would like to thank all those members who supported the recent SAGAS meeting at the new South Downs Planetarium. The summer SAGAS meeting for 2002 will be held in Portsmouth dockyard. Some details of that meeting are available now – further details will follow.

Membership

Brian Halls

Just a reminder to everyone – membership fees are now due for the 2001-2002 session.

Just a reminder of the fees: -

- **Full Membership** £14.00
- **Family Membership** £21.00
- **Junior Membership** £ 6.00

If you choose not to pay a subscription, the next issue of WAS News (December) shall be your last one, so please get your cheques/postal orders to Mike Marshall (address on back page)

Maps of the Moon

Alwyn Botha

I made two detailed photographic maps of the moon available (for free) online at <http://www.moon-phases.com/>

This website also has 300 quizzes about these maps of the moon. Each question has a small picture of a part of the moon. You have to identify craters, rills, mountains, etc.

You are welcome to link to any of these maps of the moon - or the website itself. Please inform you club's members about these online maps of the moon.

I have other educational astronomy websites too - some are listed below.

Thank you.

<http://www.moon-phases.com/>
<http://www.the-solar-system.net>
<http://www.galileo-galilei.org/>
<http://www.the-planet-jupiter.com>

WAS Ad

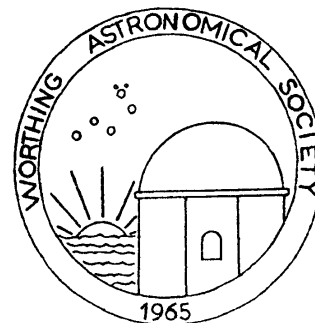
Polo shirts – Jumpers

Brian Halls

Want to dress in the latest WAS fashion? Appear at the observation night in the trendiest of gear?

Then you must have a WAS jumper and / or polo shirt with the Society observatory and stars logo on them! In hardwearing, good quality material – in dark blue with silver logo.

Order them today!!! Cost – polo shirt £11.95 and jumper £13.95; please advise S, M, L or XL.



What's on the Box?

Sunday 18th November 2001

BBC TWO

20.50-21.00 ~ The Planets – Brief Encounter (Birth and Death) Documentary series exploring space. This edition looks at the creation and ultimate destruction of our solar system

Wednesday 21st November 2001

BBC RADIO 4

18.30-19.00 ~ The Hitchhiker's Guide to the Galaxy Douglas Adams's epic adventure in time and space. Fit the eleventh: In which our heroes do a lot of running and digging. With Peter Jones, Geoffrey McGivern and Simon Jones

BBC KNOWLEDGE

19.00-19.50 ~ The Planets (Atmosphere) Documentary series about the solar system. This programme describes the investigation of weather systems found throughout the solar system. Scientists have discovered sulphuric acid rain and metallic snow on Venus, while space probes have revealed the arid surface and frozen seas of Mars. The latest data and graphics show what a new probe might find when it reaches a distant moon of Saturn in 2003

Thursday 22nd November 2001

BBC KNOWLEDGE

01.10-02.00 ~ The Planets (Atmosphere) Documentary series about the solar system. This programme describes the investigation of weather systems found throughout the solar system. Scientists have discovered sulphuric acid rain and metallic snow on Venus, while space probes have revealed the arid surface and frozen seas of Mars. The latest data and graphics show what a new probe might find when it reaches a distant moon of Saturn in 2003

Wednesday 28th November 2001

BBC RADIO 4

18.30-19.00 ~ The Hitchhiker's Guide to the Galaxy Douglas Adams's epic adventure in time and space. Fit the twelfth. With Peter Jones, Geoffrey McGivern and Simon Jones

WAS News News

Impact craters give clues about Europa's ice crust

University of Arizona News Release - November 9th

Impact craters on Europa -- the jovian satellite that scientists say may hide a subsurface liquid ocean - show that the moon's brittle ice shell crust is more than 3 to 4 kilometres (1.8 to 2.4 miles) thick, two University of Arizona planetary scientists report in *Science* (Nov. 9 issue).



The Grainne Crater on Europa. Credit: Elizabeth Turtle Planetary Image Research Lab, Lunar and Planetary Lab, University of Arizona

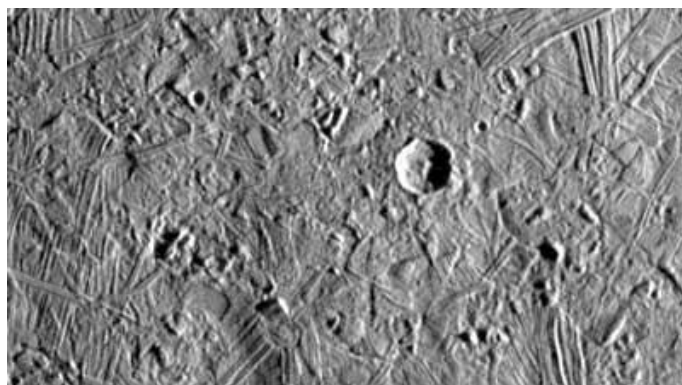
The thickness of Europa's hard ice shell is a hot scientific debate. Some argue the crust must be only one or two kilometres (six-tenths mile to 1.2 miles) thick, given ridges, cycloid cracks and other geological features. Others contend the ice crust must be 10 times thicker, and that it includes a warm convecting ice layer that shapes observed surface features.

Beyond geology, the wider fascination with Europa is the possibility that it conceals a liquid water ocean, and, potentially, life. Instruments proposed for a future Europa orbiter mission include radar and other instruments to detect and explore the possible ocean. To explore an

ocean - if it does indeed exist - scientists have to know the thickness of the overlying ice.

Elizabeth P. Turtle and Elisabetta Pierazzo of the UA Lunar and Planetary Laboratory numerically simulated impacts powerful enough to produce central peaks in impact craters imaged by the Galileo spacecraft.

At least six of 28 impact craters observed by Galileo and Voyager have well defined central peaks, Turtle said. They are found in craters larger than 5 kilometers (3 miles) in diameter.



The Brigid Crater on Europa. Credit: Elizabeth Turtle Planetary Image Research Lab, Lunar and Planetary Lab, University of Arizona

"There aren't many impact craters on Europa, but those that exist can tell us a lot because we understand the cratering process better than we understand many of the other processes that shape Europa's surface," Turtle said.

"The morphologies (structure) of some craters indicate that these impacts didn't completely vaporize or melt through a cold, brittle ice layer on Europa. So based on this observation, our impact simulations demonstrate that the ice crust must be more than 3 to 4 kilometers thick," Turtle said. "I should emphasize that what we've done is put a lower limit on the thickness of the ice. These simulations do not put an upper limit on ice thickness."

Central peak craters are observed on Earth, the moon, and Mars, Turtle said. "We have geologic evidence from Earth and the moon that shows that the material that collapses up into the central peak is material that was previously buried, but has been uplifted and broken up. Central peaks are deep bedrock that has been uplifted," much like a splash that results from dropping something into water, Turtle said.

"What we're seeing here on Europa appear to be standard central peaks. Since central peaks are deep material that's been uplifted, that means these impacts could not have

penetrated through European ice to water. Water would not have been able to form and maintain a central peak."

Researchers also have hypothesized that Europa might have a thick ice shell composed of a thin brittle layer over warm convecting ice. But Turtle's and Pierazzo's research shows that the impacts couldn't have even penetrated to warm ice.



The Pwyll Crater on Europa. Credit: Elizabeth Turtle Planetary Image Research Lab, Lunar and Planetary Lab, University of Arizona

Europa's largest known central peak impact crater, the 24-kilometer (14-mile) diameter Pwyll, for example, contains a central peak roughly 5 kilometers (3 miles) in diameter and about 500 meters (three-tenths mile) high. Turtle calculated that if there were warm convecting ice beneath Pwyll's peak, the peak would have disappeared in less than a year.

This work is the first step in a multi-stage modeling project to determine ice thickness and better understand the geology and evolution of Europa, the UA scientists say.

The very sophisticated code that Pierazzo applied in this research to simulate the passage of the impact shock wave through water ice is very time consuming. It took two weeks to produce simulations of shock waves that occur in fractions of a second.

The next step is to use a less detailed and less time consuming code to simulate crater excavation and collapse to put further limits on the ice thickness, Turtle said.

In future research the team plans to simulate the temperature distribution during impacts for insight into structure of the solid ice, and to use information on temperatures and ice strength to model how long Europa's central impact peaks might exist.

Diary

November 14 – Comets Past and Present by Alan Drummond (Crawley Astronomical Society)

December 12 - Origins of Astronomical Knowledge by Norman Walker

January 9 – Society New Year Social

February 13 – The Moon by Peter Gill (Eastbourne Astronomical Society)

March 13 - The Aurora by Neil Bone (South Downs Astronomical Society, Astronomy Now)

All Meetings (**bold**) are held on the second Wednesday of every month unless otherwise stated, at Heene Church Rooms, Worthing at 7.30 p.m. Meetings include the latest astronomical work, reports and, photographs by members. For further information please call 01903 521205, on the Internet at www.was.org.uk or

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Note to Contributors

Contributions & Correspondence for the **December** issue of WAS NEWS should be with the Editor by **December 1st**. All material for inclusion should be sent to the Editor.

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