International Geophysical Calendar 2018 (FINAL)

(See information to follow on the use of this Calendar)

	S	M	T	W	T	F	S
January		1	2^{F}	3	4	5	6
	7	8	9	10^{+}	11^{+}	12^{+}	13^{+}
	14^{+}	15^{++}	16^{*++}	17^{N*++}	18^{*++}	19^{+}	20^{+}
	21^{+}	22^{+}	23^{+}	24^{+}	25^{+}	26^{+}	27^{+}
	28^{+}	29^{+}	30^{+}	31^{F+}	1^{+}	2^{+}	3^{+}
February	4^{+}	5^{+}	6^{+}	7^{+}	8^{+}	9^{+}	10^{+}
	11	12	13	14^{*+}	15^{N*+}	16^{*+}	17^{+}
	18^{+}	19^{+}	20	21	22	23	24
	25	26	27	28	1	2^{F}	3
March	4	5	6	7	8	9	10
	11	12	13	14*	15*	16*	17^{N}
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31^{F}
April	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16^{N*}	17*	18*	19	20	21
	22	23	24	25	26	27	28
	29	30^{F}	1	2	3	4	5
May	6	7	8	9	10	11	12
	13	14*	15^{N*}	16*	17	18	19
	20	21	22	23	24	25	26
	27	28	29^{F}	30	31	1	2
June	3	4	5	6^{+}	7^{+}	8^{+}	9^{+}
	10^{+}	11^{+}	12^{*++}	13^{N*++}	14^{*++}	15^{++}	16^{+}
	17^{+}	18^{+}	19^{+}	20^{+}	21^{+}	22^{+}	23^{+}
	24^{+}	25^{+}	26	27	28^{F}	29	30
	S	M	T	W	T	F	S

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
July	8	9	10	11*	12*	13^{N*}	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27^{F}	28
	29	30	31	1	2	3	4
August	5	6	7	8*	9*	10*	11^{N}
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26^{F}	27	28	29	30	31	1
September	2	3	4	5	6	7	8
	9^{N}	10*	11*	12*	13	14	15
	16	17	18	19	20	21	22
	23	24	25^{F}	26	27	28	29
	30	1	2	3	4	5	6
October	7	8*	9^{N*}	10*	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24^{F}	25	26	27
	28	29	30	31	1	2	3
November	4	5	6*	7^{N*}	8*	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23^{F}	24
	25	26	27	28	29	30	1
December	2	3	4	5*	6*	7^{N*}	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22^{F}
	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
2019	6^{N}	7*	8*	9*	10	11	12
January	13	14	15	16	17	18	19
	20	21^{F}	22	23	24	25	26
	27	28	29	30	31		
	S	M	T	W	T	F	S

23 Regular World Day (RWD)

24 Priority Regular World Day (PRWD)

21 Quarterly World Day (QWD) (also a PRWD)

3 Regular Geophysical Day (RGD)

12 13 World Geophysical Interval (WGI)

15 Days of Solar Eclipse: Feb 15 (P), Jul 13 (P), Aug 11 (P)

11 12 Airglow and Aurora Period

16* Dark Moon Geophysical Day (DMGD)

N NEW MOON F FULL MOON

+ Incoherent Scatter Coordinated Observation Day

- + Qb50 Field-Aligned/Vertical
- + StratWarm: Experiment requires a 10-day run during this interval based on the predictions of sudden stratospheric warmings.
- + Patches
- + CONGSS: Experiment requires a 5-day run during this interval based on predictions of magnetic disturbances.

NOTES on other dates and programs of interest:

1. Days with significant meteor shower activity (based on UT in year 2018) — regular meteor showers: Dec 28 - Jan 12, Jan 31 - Feb 20, Apr 14 - 30, Apr 19 - May 28, May 14 - Jun 24, May 20 - Jul 05, Jun 05 - Jul 17, Jul 12 - Aug 23, Jul 17 - Aug 24, Sep 09 - Oct 09, Oct 02 - Nov 07, Nov 06-30, Dec 01-15, Dec 04-17, Dec 17-26 . These can be studied for their own geophysical effects or may be "geophysical noise" to other experiments.
(http://www.imo.net/calendar)

2. **GAW (Global Atmosphere Watch)** - early warning system for changes in greenhouse gases, ozone layer, and long range transport of pollutants.

3. **VarSITI (Variability of the Sun and Its Terrestrial Impact)** – SCOSTEP Program 2014-2018. Four scientific elements: SEE (Solar evolution and Extrema), MiniMax24/ISEST (International Study of Earth-affecting Solar Transients), SPeCIMEN (Specification and Prediction of the Coupled Inner-Magnetospheric Environment), and ROSMIC (Role Of the Sun and the Middle atmosphere/thermosphere/ionosphere In Climate).
Contact: Dr. Nat Gopalswamy (nat.gopalswamy@nasa.gov) (President of SCOSTEP) or Prof. Marianna Shepherd (mshepher@yorku.ca) (Scientific Secretary)
http://www.varsiti.org

4. **ILWS (International Living With a Star) Program** – International effort to stimulate, strengthen, and coordinate space research to understand the governing processes of the connected Sun-Earth System as an integrated entity.
http://ilwsonline.org/

5. **ISWI (International Space Weather Initiative)** – Program of international cooperation to advance space weather science by a combination of instrument deployment, analysis and interpretation of space weather data from the deployed instruments in conjunction with space data, and communicate the results to the public and students. The goal of ISWI is to develop the scientific insight necessary to understand the science, and to reconstruct and forecast near-Earth space weather. ISWI runs science workshops, capacity building activities, and space science schools.
Contact: Dr. N.Gopalswamy (nat.gopalswamy@nasa.gov) (Executive Director)
http://www.iswi-secretariat.org/

6. **+ Incoherent Scatter Coordinated Observations Days** - starting no later than 1300 UT on the first day of the interval and ending no earlier than 2000 UT on the last day of the interval (minimum 31 hours of observations):

Month	Start Date	Length	Experiment
January	15-16	2	QB50 Field-Aligned/Vertical
January	10-31	10	StratWarm (see Note 1)
February	14-16	3	Patches
June	12-13	2	QB50 Field-Aligned/Vertical
June	6-20 alert	5	CONGSS Storms (see Note 2)
Special Case	see Note 3	3	CME sudden commencement

Note 1: The decision to start this 10-day run will be based on predictions of Sudden Stratospheric Warming. In the case of no SSW event, the World Day will revert to a 5-day run at the end of the alert period, Jan 29 to Feb 3. There should be five days notice for the alert.
Note 2: The decision to start this alert-based run will be based on predictions of magnetic disturbances. The alert should be announced five days before the start of the run.
Note 3: The decision to start this alert-based run will be based on the prediction of an ICME. The alert window will last the entire year, with a best effort made by operators to respond. The alert should be announced five days before the start of the run. Intention is to catch the sudden commencement in as many radars as possible to look at the global response.

Contact: Dr. Emma Spanswick (elspansw@ucalgary.ca), Dr. Andrew Kavanagh (andkav@bas.ac.uk)
http://www.isr.sri.com
https://www.eiscat.rl.ac.uk

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EXPLANATIONS

This Calendar continues the series begun for the IGY years 1957-58, and is issued annually to recommend dates for solar and geophysical observations which cannot be carried out continuously. Thus, the amount of observational data in existence tends to be larger on Calendar days. The recommendations on data reduction and especially the flow of data to **ICSU World Data System (WDS)** in many instances emphasize Calendar days. The Calendar is prepared by the **International Space Environment Service (ISES)** with the advice of spokesmen for the various scientific disciplines.

The **2018 Solar Eclipses** are:

a) 15 Feb 2018, partial solar eclipse. Maximum of 60% coverage from Antarctica. Visibility will range on South America from 40% of the solar diameter covered at the southern tip of Tierra del Fuego, Chile, to 35% at Punta Arenas, Argentina; to 28% in Comodoro Rivadavia, Argentina; to 16% in Buenos Aires, Argentina; to 7% in Santiago, Chile; ranging as far north as Asuncion, Argentina.
b) 13 July 2018, partial solar eclipse. Maximum of 34% at the northern tip of Antarctica south of Australia. Visibility will be 10% at Hobart, Tasmania, Australia; 2% at an altitude of 29° at Melbourne and south of Adelaide, Australia.
c) 11 August 2018, partial solar eclipse. Visible from northern Europe and Asia, Greenland, and northeasternmost Canada. Coverage is 5% at Oslo, Norway; 29% at Tromso, Norway; 4% at Stockholm, Sweden; 9% at St. Petersburg, Russia; 20% at Urumqi, China; 40% at Ulan Bator, Mongolia; and 34% at Beijing, China, just before sunset; as well as 20% at Reykjavik, Iceland; and sunrise in northeastern Quebec, Newfoundland, and Labrador.

Information assembled by Jay M. Pasachoff, Williams College (Williamstown, MA), Chair, International Astronomical Union's working group on Eclipses (http://www.eclipses.info) with thanks to Fred Espenak (Arizona) (Thousand Year Canon of Solar Ecllipses 1501 to 2500; http://www.astropixels.com/pubs; http://www.EclipseWise.com) and Xavier Jubier (Paris) for their data and maps. See also Michael Zeiler's http://eclipse-maps.com and http://GreatAmericanEclipse.com for maps and Jay Anderson's http://eclipsophile.com for weather discussions.

Meteor Showers Selected from data compiled by Jürgen Rendtel for the International Meteor Organization Shower Calendar 2018. Includes meteor showers observable mainly by radio and radar techniques. The dates are given in Note 1 on the previous page.

Definitions:

Time	=	Universal Time **(UT)**
Geophysical Day **(RGD)**	=	each Wednesday
Regular World Day **(RWD)**	=	Tuesday, Wednesday and Thursday, one per month
Priority Regular World Day **(PRWD)**	=	the Wednesday **RWD**
World Geophysical Interval **(WGI)**	=	14 consecutive days each season
Quarterly World Day **(QWD)**	=	**PRWD** in the **WGI**
ALERT	=	occurrence of unusual solar or geophysical conditions, broadcast once daily soon after 0400 UT

For more detailed explanations of the definitions, please visit http://www.ngdc.noaa.gov/stp/space-weather/online-publications/igc_calendars/ or http://www.spaceweather.org/.

Priority recommended programs for measurements <u>not made continuously</u> (in addition to unusual **ALERT** periods):

Airglow and Aurora — Observation periods are New Moon periods, especially the 7 day intervals on the calendar;

Atmospheric Electricity — Observation periods are the **RGD** each Wednesday, beginning on 3 Jan 2018 at 0000 UT, 10 Jan at 0600 UT, 17 Jan at 1200 UT, 21 Jan at 1800 UT, etc. Minimum program is **PRWDs**.

Geomagnetic Phenomena — At the minimum, need observation periods and data reduction on **RWDs** and during **MAGSTORM Alerts.**

Ionospheric Phenomena — Quarter-hourly ionograms; more frequently on **RWDs,** particularly at high latitude sites; f-plots on **RWDs;** hourly ionogram scaled parameters to **WDCs** on **QWDs**; continuous observations for solar eclipse in eclipse zone. See **Airglow and Aurora.**

Incoherent Scatter — Observations on Incoherent Scatter Coordinated Days; also intensive series on **WGIs** or **Airglow and Aurora** periods.

Special programs: Dr. Emma Spanswick (elspansw@ucalgary.ca) or Dr. Andrew Kavanagh (andkav@bas.ac.uk). See http://www.isr.sri.com

Ionospheric Drifts — During weeks with **RWDs.**

Travelling Ionospheric Disturbances (TIDs) — special periods, probably **PRWDs** or **RWDs**.

Ionospheric Absorption — Half-hourly on **RWDs**; continuous on solar eclipse days in eclipse zone and conjugate area. Daily measurements during Absorption Winter Anomaly at temperate latitude stations (Oct-Mar Northern Hemisphere; Apr-Sep Southern Hemisphere).

Backscatter and Forward Scatter — **RWDs** at least.

Mesospheric D region electron densities — **RGDs** around noon.

ELF Noise Measurements of earth-ionosphere cavity resonances — WGIs.

All Programs — Appropriate intensive observations during unusual meteor activity.

Meteorology — Especially on **RGDs**. On **WGIs** and **STRATWARM** Alert Intervals, please monitor on Mondays, Wednesdays, and Fridays.

GAW (Global Atmosphere Watch) -- WMO program to integrate monitoring of atmospheric composition. Early warning system of changes in atmospheric concentrations of greenhouse gases, ozone, and pollutants (acid rain and dust particles). WMO, 7 bis avenue de la Paix, P.O. Box 2300, CH-1211 Geneva 2, Switzerland.
http://www.wmo.int/pages/prog/arep/gaw/gaw_home_en.html

Solar Phenomena — Solar eclipse days, **RWDs,** and during **PROTON/FLARE ALERTS.**

VarSITI (Variability of the Sun and Its Terrestrial Impact)–Program within SCOSTEP (Scientific Committee on Solar-Terrestrial Physics): 2014-2018. The VarSITI program strives for international collaboration in data analysis, modeling, and theory to understand how the solar variability affects Earth. The VarSITI program has four scientific projects that address solar terrestrial problems keeping the current low solar activity as the common thread: SEE (Solar evolution and Extrema), MiniMax24/ISEST (International Study of Earth-affecting Solar Transients), SPeCIMEN (Specification and Prediction of the Coupled Inner-Magnetospheric Environment), and ROSMIC (Role Of the Sun and the Middle atmosphere/thermosphere/ionosphere In Climate). Contact: Dr. Nat Gopalswamy (nat.gopalswamy@nasa.gov), President of SCOSTEP or Prof. Marianna Shepherd (mshepher@yorku.ca), Scientific Secretary. Co-chairs are Katya Georgieva (SRTI, Bulgaria) and Kazuo Shiokawa (STEL, Japan). Detailed information on the VarSITI program is available at http://www.varsiti.org.

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ISWI (International Space Weather Initiative) – a program of international cooperation to advance space weather science by a combination of instrument deployment, analysis and interpretation of space weather data from the deployed instruments in conjunction with space data, and communicate the results to the public and students. The goal of ISWI is to develop the scientific insight necessary to understand the science, and to reconstruct and forecast near-Earth space weather. ISWI runs science workshops, capacity building activities, and space science schools. Contact Dr. N. Gopalswamy, Executive Director at nat.gopalswamy@nasa.gov.

Space Research, Interplanetary Phenomena, Cosmic Rays, Aeronomy — QWDs, RWDs, Airglow and Aurora periods.

The International Space Environment Services (ISES) is a space weather service organization currently comprised of globally distributed Regional Warning Centers, Associate Warning Centers, and one Collaborative Expert Center (European Space Agency). ISES is a Network Member of the International Council for Science World Data System (ICSU-WDS) and collaborates with the World Meteorological Organization (WMO) and other international organizations, including the Committee on Space Research (COSPAR), the UN Committee on the Peaceful Uses of Outer Space (COPUOS), the International Union of Radio Science (URSI), and the International Union of Geodesy and Geophysics (IUGG). ISES works in close cooperation with the WMO and other international organizations to benefit from complementary activities that enhance the availability of data, the exchange of information, and the improvement and dissemination of services, recognizing the mutual interest in global data acquisition and information exchange, in common application sectors, and in understanding and predicting the coupled Earth-Sun environment.

The mission of ISES is to deliver, coordinate and improve operational space weather services. This is accomplished through the rapid exchange of space environment information; the sharing of best practices for data analysis and product development; and the open dissemination of products and services. ISES is organized and operated for the benefit of the international space weather user community.

Through its members, ISES shares data and forecasts and provides space weather products and services to users in their regions. Products and services include but are not limited to: forecasts, watches, warnings, and alerts of solar, magnetospheric, geomagnetic and ionospheric conditions; extensive space environment data; customer-focused event analyses; and long-range predictions of the solar cycle.

This Calendar for 2018 has been drawn up by Dr. Robyn Fiori of the ISES Steering Committee, in association with spokesmen for the various scientific disciplines in the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), the International Association of Geomagnetism and Aeronomy (IAGA), URSI and other ICSU organizations. Similar Calendars are issued annually beginning with the IGY, 1957-58. PDF versions of the past calendars are available online.

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Copies of earlier years' calendars are available upon request to either ISES Director, Dr. Terry Onsager, NOAA Space Weather Prediction Center, 325 Broadway, Boulder, CO, 80305, USA, telephone +1-303-497-5713, FAX +1-303-497-3645, e-mail Terry.Onsager@noaa.gov, or contact ISES Secretary for World Days, Dr. Robyn Fiori, telephone +1-613-837-5137, e-mail robyn.fiori@canada.ca. Beginning with the 2008 Calendar, all calendars are available only in digital format.

The website for the International Geophysical Calendar, including recent versions, can be found at http://www.spaceweather.org/ISES/info/geocal/geocal.html. Archived calendars from 1957 to present are available at http://www.ngdc.noaa.gov/stp/space-weather/online-publications/igc_calendars/.