

International Geophysical Calendar 2009 (FINAL)

(See other side for information on use of this Calendar)

| | S | M | T | W | T | F | S | | S | M | T | W | T | F | S | |
|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|
| JANUARY | | | | | 1 | 2 | 3 | | | | | 1 | 2 | 3 | 4 | JULY |
| | 4 | 5 | 6 | 7 | 8 ⁺ | 9 ⁺ | 10 | | 5 | 6 | 7 ^F | 8 | 9 | 10 | 11 | |
| | 11 ^F | 12 | 13 | 14 | 15 | 16 | 17 | | 12 | 13 | 14 | 15 [*] | 16 [*] | 17 | 18 | |
| | 18 | 19 | 20 | 21 [*] | 22 ⁺ | 23 ⁺ | 24 | | 19 | 20 | 21 | 22 ^N | 23 | 24 | 25 | |
| | 25 | 26 ^N | 27 | 28 | 29 | 30 | 31 | | 26 | 27 | 28 | 29 | 30 | 31 | 1 | |
| FEBRUARY | 1 | 2 | 3 | 4 ⁺ | 5 ⁺ | 6 ⁺ | 7 | | 2 | 3 | 4 | 5 | 6 ^F | 7 | 8 | AUGUST |
| | 8 | 9 ^F | 10 ⁺ | 11 | 12 | 13 | 14 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
| | 15 | 16 | 17 | 18 [*] | 19 ⁺ | 20 ⁺ | 21 | | 16 | 17 | 18 | 19 [*] | 20 ^N | 21 | 22 | |
| | 22 | 23 | 24 | 25 ^N | 26 | 27 | 28 | | 23 | 24 | 25 | 26 | 27 | 28 | 29 | |
| MARCH | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 30 | 31 | 1 | 1 | 3 | 4 ^F | 5 | SEPTEMBER |
| | 8 | 9 | 10 | 11 ^F | 12 | 13 | 14 | | 6 | 7 | 8 | 9 | 10 ⁺ | 11 | 12 | |
| | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | 13 | 14 | 15 ⁺ | 16 ⁺ | 17 ⁺ | 18 ^N | 19 | |
| | 22 | 23 | 24 ⁺ | 25 ⁺ | 26 ⁺ | 27 | 28 | | 20 | 21 | 22 [*] | 23 [*] | 24 | 25 | 26 | |
| | 29 | 30 | 31 | 1 | 2 | 3 | 4 | | 27 | 28 | 29 | 30 | 1 | 2 | 3 | |
| APRIL | 5 | 6 | 7 | 8 | 9 ^F | 10 | 11 | | 4 ^F | 5 | 6 | 7 | 8 | 9 | 10 | OCTOBER |
| | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | 11 | 12 | 13 | 14 | 15 | 16 | 17 | |
| | 19 | 20 | 21 | 22 [*] | 23 [*] | 24 | 25 ^N | | 18 ^N | 19 | 20 [*] | 21 [*] | 22 | 23 | 24 | |
| | 26 | 27 | 28 | 29 | 30 | 1 | 2 | | 25 | 26 | 27 | 28 | 29 | 30 | 31 | |
| MAY | 3 | 4 | 5 | 6 | 7 | 8 | 9 ^F | | 1 | 2 ^F | 3 | 4 | 5 | 6 | 7 | NOVEMBER |
| | 10 | 11 | 12 ⁺ | 13 ⁺ | 14 ⁺ | 15 | 16 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
| | 17 | 18 | 19 | 20 [*] | 21 [*] | 22 | 23 | | 15 | 16 ^N | 17 [*] | 18 [*] | 19 | 20 | 21 | |
| | 24 ^N | 25 | 26 | 27 | 28 | 29 | 30 | | 22 | 23 | 24 | 25 | 26 | 27 | 28 | |
| | 30 | 1 | 2 | 3 | 4 | 5 | 6 | | 29 | 30 | 1 | 2 ^F | 3 | 4 | 5 | DECEMBER |
| JUNE | 7 ^F | 8 | 9 | 10 | 11 | 12 | 13 | | 6 | 7 ⁺ | 8 ⁺ | 9 ⁺ | 10 ⁺ | 11 ⁺ | 12 ⁺ | |
| | 14 | 15 | 16 | 17 [*] | 18 [*] | 19 | 20 | | 13 | 14 | 15 [*] | 16 [*] | 17 | 18 | 19 | |
| | 21 | 22 ^N | 23 ⁺ | 24 ⁺ | 25 ⁺ | 26 | 27 | | 20 | 21 | 22 | 23 | 24 | 25 | 26 | |
| | 28 | 29 | 30 | | | | | | 27 | 28 | 29 | 30 | 31 ^F | 1 | 2 | |
| | | | | | | | | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 2010 |
| | S | M | T | W | T | F | S | | | | | | | | | JANUARY |

20 Regular World Day (RWD)

21 Priority Regular World Day (PRWD)

18 Quarterly World Day (QWD)

also a PRWD and RWD

7 Regular Geophysical Day (RGD)

9 10 World Geophysical Interval (WGI)

8 + Incoherent Scatter Coordinated Observation Day

N NEW MOON F FULL MOON

26 Day of Solar Eclipse: Jan 26 (annular) and Jul 22 (total)

22 23 Airglow and Aurora Period

21* Dark Moon Geophysical Day (DMGD)

NOTES on other dates and programs of interest:

1. Days with **significant meteor shower** activity (based on UT in year 2009) — regular meteor showers: Jan 1-6; Apr 16-25; Apr 19-May 28; May 22-Jul 2; May 20-Jul 5; Jun 5-Jul 17; Jul 8-Aug 19; Jul 17-Aug 24; Sep 26-Oct 3; Oct 2-Nov 7; Oct 31-Nov 23; Nov 27-Dec 18; Dec 17-26. These can be studied for their own geophysical effects or may be “geophysical noise” to other experiments. See calendar webpage for details.

2. **GAW (Global Atmosphere Watch)** -- early warning system for changes in greenhouse gases, ozone layer, and long range transport of pollutants -- http://www.wmo.ch/web/arep/gaw/gaw_home.html. (See Explanations.)

3. **CAWSES (Climate and Weather of the Sun-Earth System)** -- SCOSTEP Program 2004-2008. Theme areas: Solar Influence on Climate; Space Weather: Science and Applications; Atmospheric Coupling Processes; Space Climatology; and Capacity Building and Education. <http://www.bu.edu/cawses> (See Explanations.) (S. Avery –susan.avery@colorado.edu)

4. **IHY (International Heliophysical Year) 2007** – International effort to advance our understanding of the fundamental heliophysical processes that govern the Sun, Earth, and Heliosphere — <http://ihy2007.org/>. See also the IPY (International Polar Year) — <http://www.ipy.org/>; IYPE (International Year of the Planet Earth) — <http://www.yearofplanetearth.org/>; and eGY (Electronic Geophysical Year 2007-2008) — <http://www.egy.org/> — all celebrating the 50th Anniversary of the IGY (International Geophysical Year 1957-58) <http://www.nas.edu/history/igy/>.

5. + **Incoherent Scatter Coordinated Observations Days** (see Explanations) starting at 1300 UT on the first day of the intervals indicated, and ending at 1600 UT on the last day of the intervals: Jan 8 IPY; Jan 22 IPY; Feb ten days Alert (STRATWARM); Feb 4 TID+IPY; Feb 19 IPY; Mar 24 Synoptic; May 12 TID; Jun 22 Meteor; Jun 23 PMSE; Sep ten days Alert (STRATWARM); Sep 15 TID; Dec 7 TEC+Solar Wind Effects. See <http://e7.eiscat.se/Members/ingemar/schedule/2009VDSchedule.htm>.

where **Synoptic** = Wide coverage of the F-region, with topside or E-region also (W. Swartz -- wes@ece.cornell.edu);

Stratospheric Warmings = Dynamics of lower thermosphere during stratospheric warming (L. Goncharenko -- lpg@haystack.mit.edu);

TEC Mapping = ISR/GPS Electron Density Variations Shun-Rong Zhang -- shunrong@haystack.mit.edu)

QP TIDs = Quasi-Periodic Traveling Ionospheric Disturbances-extended lat coverage (J.D. Mathews – JDMathews@psu.edu)

AO = Arecibo Obs (<http://www.naic.edu/aisr/olmon2/omframedoc.html>) Incoherent Scatter Radar (ISR);

JRO = Jicamarca Radio Obs (http://jro.igp.gob.pe/english/radar/operation/real-time_en.php);

IPY = IPY-long observations with the EISCAT Svalbard ISR (Tony.van.Eyken@eiscat.se -- <https://e7.eiscat.se/groups/IPY>)

PMSE = Polar phenomena, run at EISCAT, PFISR and RISR.

FINAL EDITION, January 2009

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 **World Data Centers (WDCs)** 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 **Solar Eclipses** are:

- a.) **January 26, 2009, annular eclipse**, up to 7 m 54 s, visible in Indonesia (southern Sumatra, western tip of Java, and most of Borneo). Partial phases will be visible from southern Africa, southern India, southeast Asia, and western Australia.
- b.) **July 22, 2009, total solar eclipse**, the longest in the 18 year 11 1/3-day Saros series, with maximum of 6 m 39 s in mid-Pacific. Eclipse begins in rainy season in India, crosses eastern tip of Nepal, Bangladesh, Sikkim, Bhutan, northernmost Myanmar, China from west to east (including Wuhan, Hangzhou and Shanghai, with over 5 min totality and close to 6 min on the central line between them), and some southern Japanese islands. Partial phases visible from all of China, from western Russia, most of southeast Asia, and the northern tip of Australia's Cape York. (Information provided by Jay M. Pasachoff, IAU Working Group on Eclipses, based on maps by Fred Espenak, NASA's Goddard Space Flight Center and from Peterson Field Guide to the Stars and Planets (Pasachoff input). See <http://www.eclipses.info>.)

Meteor Showers (selected by P. Jenniskens, SETI Institute, Mountain View, CA, pjenniskens@mail.arc.nasa.gov) include important visual showers and also unusual showers observable mainly by radio and radar techniques. Summary dates are given in Note 1 under the Calendar. For more details, see the extended text at <http://www.ngdc.noaa.gov/stp/SOLAR/IGCwebpage4.html>.

Definitions:

Time = Universal Time (**UT**);

Regular Geophysical Days (**RGD**) = each Wednesday;

Regular World Days (**RWD**) = Tuesday, Wednesday and Thursday near the middle of the month (see calendar);

Priority Regular World Days (**PRWD**) = the Wednesday **RWD**;

Quarterly World Days (**QWD**) = **PRWD** in the **WGI**;

World Geophysical Intervals (**WGI**) = 14 consecutive days each season (see calendar);

ALERTS = occurrence of unusual solar or geophysical conditions, broadcast once daily soon after 0400 UT;

STRATWARM = stratospheric warmings;

Retrospective World Intervals (**RWI**) = MONSEE study intervals

For more detailed explanations of the definitions, please visit <http://www.ngdc.noaa.gov/stp/SOLAR/IGCwebpage3.html> or contact H. Coffey (address below):

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

Aurora and Airglow — 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 7 January 2009 at 0000 UT, 14 January at 0600 UT, 21 January at 1200 UT, 28 January 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 the 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. Ingemar Haggstrom, EISCAT, Box 812, SE-98128 Kiruna, Sweden; tel: +46 98079155; Fax: +46 98079159; e-mail ingemar@eiscat.se. URSI Working Group G.5. See <http://e7.eiscat.se/Members/ingemar/schedule/2009WDSchedule.htm>.

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

Traveling Ionosphere Disturbances — special periods, probably **PRWD** or **RWDs**.

Ionospheric Absorption — Half-hourly on **RWDs**; continuous on solar eclipse days for stations 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 — **RGD** 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 and Fridays as well as Wednesdays.

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, 41 avenue Giuseppe-Motta, P.O. Box 2300, 1211 Geneva 2, Switzerland.

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

CAWSES (Climate and Weather of the Sun-Earth System) -- SCOSTEP Program 2004-2008. Focus on fully utilizing past, present, and future data; and improving space weather forecasting, the design of space- and Earth-based technological systems, and understanding the solar-terrestrial influences on Global Change. Contact is Susan Avery (susan.avery@colorado.edu), Chair of CAWSES Science Steering Group. Program "theme" areas: Solar Influence on Climate; Space Weather: Science and Applications; Atmospheric Coupling Processes; Space Climatology; and Capacity Building and Education. See <http://www.bu.edu/cawses/>

IHY (International Heliophysical Year) 2007-2009 – International effort to advance our understanding of the fundamental heliophysical processes that govern the Sun, Earth, and Heliosphere — <http://ihy2007.org/>. See also the **IPY (International Polar Year)** — <http://www.ipy.org/>; **IYPE (International Year of the Planet Earth)** — <http://www.yearofplanetearth.org/>, and **eGY (Electronic Geophysical Year 2007-2008)** — <http://www.egy.org/> — all celebrating 50th Anniversary of the IGY (International Geophysical Year 1957-58) <http://www.nas.edu/history/igy/>.

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

The **International Space Environment Service (ISES)** is a permanent scientific service of the International Union of Radio Science (URSI), with the participation of the International Astronomical Union (IAU) and the International Union of Geodesy and Geophysics (IUGG). ISES adheres to the Federation of Astronomical and Geophysical Data Analysis Services (FAGS) of the International Council for Science (ICSU). The ISES coordinates the international aspects of the world days program and rapid data interchange.

This Calendar for 2009 has been drawn up by H.E. Coffey, of the ISES Steering Committee, in association with spokesmen for the various scientific disciplines in SCOSTEP, IAGA, URSI and other ICSU organizations. Similar Calendars are issued annually beginning with the IGY, 1957-58, and are published in various widely available scientific publications. PDF versions are available online at ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/IGC_CALENDAR.

Published for the International Council for Science and with financial assistance of UNESCO.

Copies of earlier years' calendars are available upon request to either ISES Director, Dr. David Boteler, Geomagnetic Laboratory, Natural Resources Canada, 7 Observatory Crescent, Ottawa, Ontario, Canada, K1A 0Y3, FAX (613)824-9803, e-mail dboteler@NRCan.gc.ca, or ISES Secretary for World Days, Ms. Helen Coffey, WDC-A for Solar-Terrestrial Physics, NOAA E/GC2, 325 Broadway, Boulder, Colorado 80305, USA, Fax number (303)497-6513, e-mail Helen.E.Coffey@noaa.gov. Beginning with the 2008 Calendar, all calendars are available only in digital format.

Calendar information is available on-line at <http://www.ises-spaceweather.org/>. The International Geophysical Calendar and descriptive text is available online at <http://www.ngdc.noaa.gov/stp/SOLAR/IGCwebpage4.html>.