

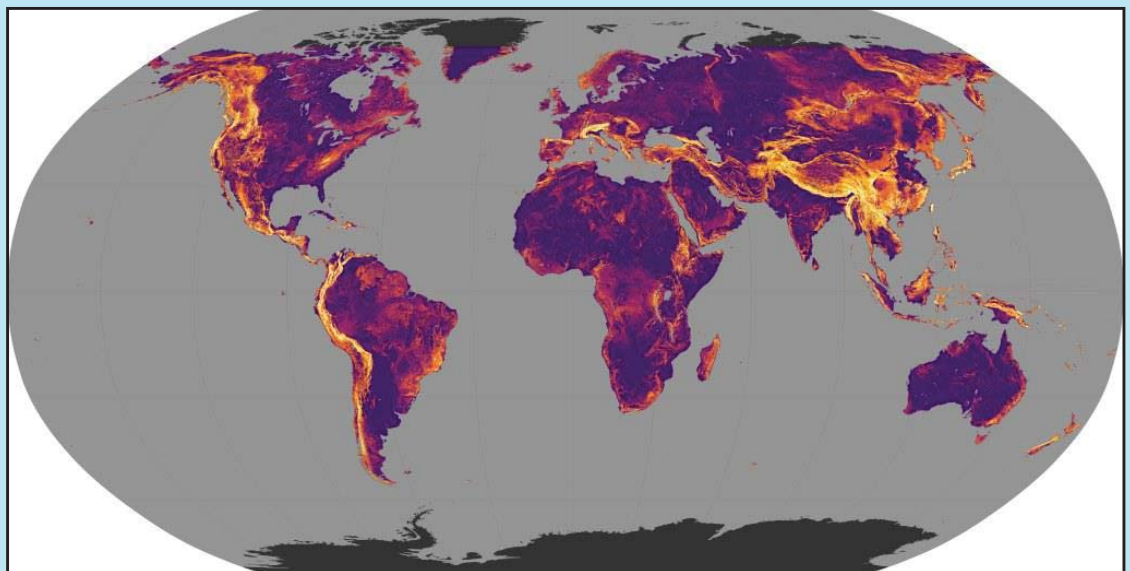
SAVING LIVES BY STUDYING LANDSLIDE SUSCEPTIBILITY

Landslides, floods and mudslides seem to be reported in the news weekly if not monthly. A quick survey revealed articles of death and destruction in the following areas just in spring 2017: Sichuan Province, China (120 people reported missing); Colombia (at least 254 dead); and Bangladesh (at least 140 reported dead); and more continue to be reported into the summer months throughout the world. In April 2017, in southern Kyrgyzstan, dozens of homes were destroyed by a landslide that resulted from “a hillside saturated by melting snow and rainfall that collapsed near the village of Kurbu-Tash” (from Earth Observatory’s item, “Landslide in Southern Kyrgyzstan”).

Thomas Stanley (617/USRA) and **Dalia Kirschbaum’s** (617/GSFC) landslide research has been highlighted frequently on NASA.gov’s Earth Observatory, including an item on April 6, 2017, titled “Overlooked Landslides”, which referenced the Global Landslide Catalog (GLC) Stanley and Kirschbaum constructed; they also explained that there is less awareness of the significant amount of landslides in Africa and South America; additionally, “Of the 5,741 landslides included in the GLC from 2007-2013, roughly half occurred in Asia, and 67% of reported deaths occurred in that region; however, 7% of deaths were in Africa and 18% in South America.” Kirschbaum and Stanley point out that the catalog does not include all landslides; “[given the origination of the data,] many smaller and some larger landslides can be unreported.” Further studies and examination of data of landslide reports and number of deaths reported continues, with comparison of the catalog and the susceptibility map, along with other sources. (See <https://earthobservatory.nasa.gov/IOTD/view.php?id=89969>.)

Mr. Stanley and Dr. Kirschbaum also have created a global susceptibility map, which was detailed in a paper in *Nature* earlier this year: Stanley, T. and D. Kirschbaum (2017), A heuristic approach to global landslide susceptibility mapping, *Nat. Hazards*, 87:145-164, doi:10.1007/s11069-017-2757-y. As explained in the article, “Landslide inventories from several different events, geographic regions, and methodologies were obtained for validation of the map. Of these, only the Global Landslide Catalog (GLC) covers the entire study area. The GLC was compiled from media reports, online disaster databases, and other sources when available, with an emphasis on rainfall-triggered landslides.” Also, Adam Voiland wrote a March 30, 2017 feature for Earth Observatory titled “A Global View of Landslide Susceptibility” (<https://earthobservatory.nasa.gov/IOTD/view.php?id=89937>).

This map also was featured in an April 2017 article in *Geographical* titled “The extreme inequality of landslides”. The Global Landslide Model shows where landslides are likely to occur based on the amount of rainfall and the surrounding terrain. Mountainous areas with higher slopes and at higher altitudes are at a greater risk of landslides. The model combines precipitation data from the Global
(cont’d on page 2)



From “A Global View of Landslide Susceptibility”. Image credit: Jesse Allen/NASA EO, based on data from Thomas Stanley and Dalia Kirschbaum.

(Landslides, cont'd)

Precipitation Model (GPM) with other variables such as slope, distance to fault lines, road construction, and geological conditions. Other data utilized in this model is elevation data from the Shuttle Radar Topography Mission (SRTM) and deforestation data from Landsat. Known as the Landslide Hazard Assessment Model for Situational Awareness (LHASA), the model's nowcast runs routinely every 30 minutes at the GPM website (<https://pmm.nasa.gov/precip-apps>) and provides a view of the probability of landslides worldwide. Information garnered from this map can be used by decision-makers in disaster planning and global decision support systems in attempts to avoid and reduce the possibility of loss of life and property damage.

The southern Kyrgyzstan landslide demonstrates the combination of these variables, as discussed in another EO feature: "People living in the foothills of the Tien Shan mountains in southern Kyrgyzstan face an unusually high risk of landslides. Several factors contribute to the elevated risk, including the presence of active faults, steep terrain, and the presence of landslide-prone soil types. Loess, for instance, is involved in many landslides in this region because the fine-grained soil becomes quite unstable when saturated with water. Heavy bouts of rain, the melting of snow, and small earthquakes often trigger slides. The risk is particularly high in the spring, when heavy rainfall is most likely. Since the area is densely populated, landslides take lives and destroy many homes each year." (See <https://earthobservatory.nasa.gov/IOTD/view.php?id=90255>.)

On May 20, 2017, near Big Sur, California on the scenic California Highway 1, also known as the PCH, one million tons of rocks and debris from a mudslide covered the road for one-third of a mile, making the road impassable (https://earthobservatory.nasa.gov/IOTD/view.php?id=90281&eoec=home&eoeci=iotd_title). For more information on landslides, check out a podcast in which Dr. Michelle Thaller (NASA/GSFC) interviews Dr. Kirschbaum: <https://orbital.prx.org/2017/03/lessons-in-landslides/>.



Landslide on the PCH. Image by Joshua Stevens, NASA Earth Observatory.

EVENTS

Earth Day at Union Station

On Thursday, April 20, 2017, Earth Day events were held at Union Station in Washington, DC. Several Science Communication Support Office (SCSO) staff members were onsite supporting Earth Day events, including Science Stories on the hyperwall, hands-on activities, and an autograph session by former NASA Astronaut Scott Altman. SCSO staff consists of **Winnie Humberson (lead), Ryan Barker, Sally Bensusen, Steve Graham, Heather Hanson, Marit Jentoft-Nilsen, Mark Malanoski, Debbi McLean, Kevin Miller, Amy Moran, Ishon Prescott, Cindy Trapp, and Alan Ward (606.4/GST)**; other GESTAR staff who provided support included **Eric Sokolowsky and Leann Estrada (606.4/GST)**. SCSO staff also created a Passport brochure listing all of the activities at the NASA exhibit, hyperwall posters and flyers, and promotional material. New visualizations and content were created for the hyperwall as well, with topics including planetary exploration, the universe, Earth science, and the 2017 solar eclipse.

Additionally, **Helen-Nicole Kostis (606.4/USRA)** and volunteers from the NASA Goddard Office of Communications staffed a booth for the NASA Visualization Explorer (NASA Viz). Throughout the day, the general public and students stopped by the booth to learn about the project and the work of NASA Goddard scientists, communicators and visualizers.

GESTAR Communications Workshop

On May 11, 2017, at NASA Goddard's Building 8 Auditorium, several members of the Office of Communication contributed to a workshop aimed to provide scientists with tips on communicating their research in person, on social media, and during interviews. The presentation included several short segments:

Introduction: Why science communication matters

Utilizing social media — **Katy Mersmann**

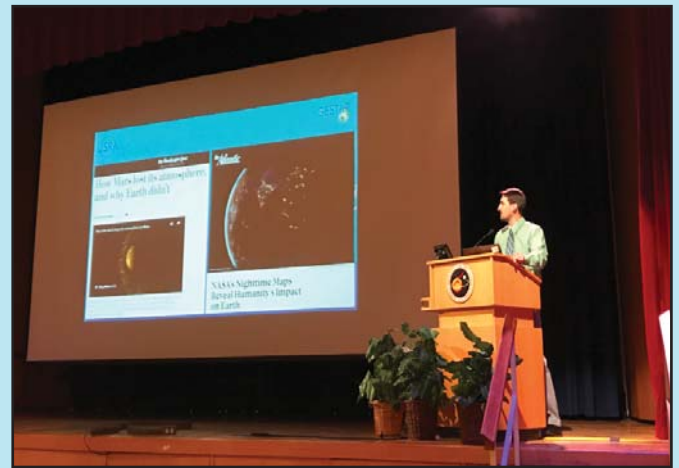
How to give effective presentations for general public — **Matt Radcliff**

Working with Code 130 (and your webmasters) — **Robert Garner**

How to appear on TV — **Michelle Handlemann**

How to elevator pitch — **Jefferson Beck.**

Genna Duberstein helped develop the presentations and provided logistical support. (All listed are 130/USRA.)



Rob Garner, speaking at the May 11th workshop (photo provided by G. Duberstein.)



Matt Radcliff speaking at the May 11th workshop (photo provided by G. Duberstein.)

StoryLab

On June 13, 2017, the Office of Communications hosted a StoryLab presentation featuring six of NASA Goddard's award-winning video producers in the Building 8 Auditorium. In "Director's Cut: A Behind-the-Scenes Look at Goddard's Award-Winning Videos," producers screened their films, explained what inspired their work, and discussed the methods they used.

Genna Duberstein – "Electric Winds of Venus"

Rich Melnick – "Show Some Love"

Jefferson Beck – "ABOVE, Piers Sellers in Greenland"

Sophia Roberts – "James Webb Space Telescope Milestone: Completion of Telescope Element"

Dan Gallagher – "Martian Atmosphere Loss Explained by NASA"

David Ladd – "Moon and More". (All are 130/USRA.)

AWARDS & ACCOLADES

In March 2017, at the 16th Electromagnetic and Light Scattering Conference, **Sergey Korkin** (613/USRA) received the 2016 Richard M. Goody Award for Atmospheric Radiation & Remote Sensing. This prestigious Elsevier/Journal of Quantitative Spectroscopy and Radiative Transfer (JQSRT) young-scientist award is named after Richard M. Goody, whose pioneering research has had a profound and long-lasting impact on the disciplines of atmospheric radiation, remote sensing, and climate change. The 2016 and 2017 Goody Awards are competed among outstanding early-career scientists who work in the fields of Atmospheric Radiation and Remote Sensing. Dr. Korkin's research is focused on numerical simulation of polarized light scattering in the Earth atmosphere. He developed and supports efficient open-source polarized radiative transfer codes, which are now used for polarization correction of data obtained from space and ground measurements. See https://www.giss.nasa.gov/staff/mmishchenko/ELS-XVI/2017_Goody_Award.pdf.

In March 2017, **Genna Duberstein** and **Brian Monroe** won the DCSWA (D.C. Science Writers Association) Newsbrief Award in the Multimedia category for their video "The Electric Wind of Venus." They were presented with a monetary award and a trophy. See <https://dcswa.org/winners-announced-for-2016-dcswa-newsbrief-award/>.

In April 2017, producers **David Ladd**, Rob Andreoli, **Jefferson Beck**, and Mike McClare received four of NASA's six annual video awards presented at the annual DTV working group meeting hosted in conjunction with the National Association of Broadcasters convention in Las Vegas. In the "Documentation" category, celebrating camera work and field production, Jefferson received two awards: second place for work on the ABoVE campaign and third place for his work with Piers Sellers in Greenland. In the "Production" category, David received an award as producer of "The Moon and More".

In early May, **Fred Lipschultz** (610/USRA) and team members came in second place in the 21st Annual Webby Awards for Best Visual Design. Their product was a tool known as the Climate Explorer, "a central component of NOAA's Climate Resilience Toolkit." More information on their product is available here: <https://toolkit.climate.gov/climate-explorer2/>.

In May 2017, **Manisha Ganeshan** (613/USRA) was awarded the International Arctic Science Committee (IASC) fellowship to join their Atmosphere Working Group (AWG). This fellowship is an opportunity for early career Arctic researchers to engage in leading-edge international scientific activities and also to develop management skills by participating in the working group activities. See <http://iasc.info/capacity-building/fellowship>.

Also in May, the American Geophysical Union publications department announced the outstanding reviewers selected by the editors of each AGU journal. **Jie Gong** (613/USRA) was selected for the 2016 AGU Editors' citation for excellence in refereeing, nominated by Editor Minghua Zhang, for JGR-Atmospheres: <https://eos.org/agu-news/in-appreciation-of-agus-outstanding-reviewers-of-2016>.

In late May 2017, the NASA Goddard YouTube channel was recognized with the YouTube Silver Play Button award, which is awarded by YouTube to any account that has achieved at least 100,000 subscribers. Says **Rob Garner** (Office of Communications), "The channel features amazing video production, data visualization and animation, and we do an excellent job curating and publicizing our work: This award belongs rightly to all of us!" Several GESTAR staff who are producers, visualizers, animators, etc., play a part in contributing to the material on this channel. As of May 2017, NASA Goddard's channel had 443,000 subscribers, which means it's almost halfway to the Gold Play Button at 1 million.

On June 16, 2017, at the 2017 Astrophysics Science Division Peer Awards Ceremony, **Scott Wiessinger** (130/USRA) was recognized with a Peer Award: "For your creativity, enthusiasm and alacrity in developing media products as part of the ASD Communications Team."

In late June 2017, the Office of the Director (Code 100) held its Peer Awards ceremony at the GEWA Recreation Center. **Michelle Handleman**, Live News Producer, and **Katrina Jackson** (130/USRA), Science Video Producer, were both recipients of a Peer Award. Michelle was recognized in the category of "Excellence in Leadership" and Katrina was recognized in the category "Collaboration and Teamwork".

(Awards, cont'd)

GESTAR Annual Excellence Awards

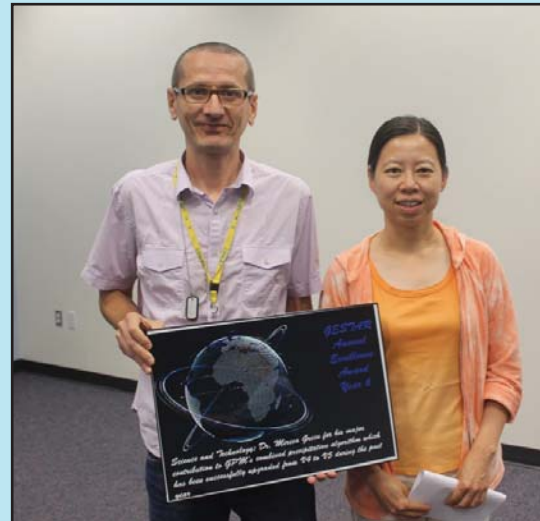
In June 2016, GESTAR began its second five-year extension, which will run from 2016-2021. A celebration to reflect on this sixth year of various accomplishments will be held in late August. For 2016 – 2017, the GESTAR Annual Excellence Awards recognized achievements in the following three categories: Leadership, Science and Technology, and Community. Nominations were made, votes were tallied, and awardees were selected. At the GESTAR All Hands Meeting held at NASA Goddard on June 28, 2017, the following three people were announced as the award winners:

Ivona Cetinic (616/USRA) in the Leadership category: “For her outstanding achievements as a scientific leader in the NASA Goddard Ocean Ecology Laboratory and in the ocean biology community at large.”



*Ivona Cetinic (middle) receives her award from Henry Selkirk (right) and Cecile Rousseaux (left).
 Photo provided by B. Corso.*

Mircea Grecu (612/MSU) in the Science and Technology category: “For his major contribution to GPM’s combined precipitation algorithm which has been successfully upgraded from V4 to V5 during the past year.”



*Mircea Grecu receives his award from Xiaowen Li.
 Photo credit: A. Houghton.*

Stephen Steenrod (614/USRA) in the Community category: “For his superior service as a System Administrator and scientist supporting the NASA Global Modeling Initiative (GMI), GEOS-5 chemistry and transport model, and Atmospheric Tomography mission (ATom) projects at NASA GSFC.”



*Stephen Steenrod receives his award from James Wang.
 Photo credit: A. Houghton.*

In The Press

Hiren Jethva's (614/USRA) research was featured in the Earth Observatory's Earth Matters blog feature, "Using Satellites to Size Up the Severity of Crop Fires in Northern India": <https://earthobservatory.nasa.gov/blogs/earthmatters/2017/02/08/the-crop-residue-fires-in-northern-india-were-the-most-severe-in-more-than-a-decade/>.

Jefferson Beck was profiled on NASA Goddard's site, "Jefferson Beck – Films Adventures in Science": <https://www.nasa.gov/feature/goddard/2017/jefferson-beck-films-adventures-in-science>.

Ivona Cetinic and others were featured in the Schmidt Ocean Institute's press release "New Technology Gives Insight to Ocean Color for NASA Satellites": <https://schmidtocean.org/new-technology-gives-insight-ocean-color-nasa-satellites/>.

In April, Port Discovery in Baltimore, MD, held its annual 'STEM in Spring' Festival. Valerie Casasanto and **Adriana Manrique Gutierrez** (615/USRA) participated by leading attendees through hands-on experiments and the altimeter exhibit: <http://www.abc2news.com/news/region/baltimore-city/port-discovery-celebrates-stem-in-spring-week>.

In June, **Santiago Gassó** (613/MSU) was interviewed by Pola Lem (Earth Observatory) for an article titled "After Patagonian Fires, A Scar Remains" regarding blowouts of ash and dust from the Patagonian desert into the South Atlantic. See <https://earthobservatory.nasa.gov/IOTD/view.php?id=90347>.

In June, several Ocean Ecology Laboratory scientists, including **Bridget Seegers** (616/USRA) and **Ivona Cetinic** participated in the 30th annual Patuxent River Wade-In. This citizen scientist event followed their Optics Express publication which discussed how Maryland Senator Bernie Fowler's

Sneaker Index data was used to develop a new clarity remote sensing water algorithm. During the event, the science conducted by the Ocean Ecology Laboratory was presented to attendees, and the scientists collected more validation data and met Senator Fowler. This research was in a NASA Goddard feature and as the NASA Earth Observatory item, "Sneaker Science": <https://www.nasa.gov/feature/goddard/2017/one-mans-shoes-help-nasa-explain-water-clarity> and <https://earthobservatory.nasa.gov/IOTD/view.php?id=90359>. The paper, titled "From toes to top-of-atmosphere: Fowler's Sneaker Depth index of water clarity for the Chesapeake Bay", authored by intern Ben Croke, Lachlan McKinna, and Ivona Cetinic, is available here: <https://www.osapublishing.org/oe/abstract.cfm?uri=oe-25-8-A361>.

From June 12-23, 2017, Charles Ichoku, Anne Thompson, **Richard Damoah** (618/MSU), and Susanne Bauer conducted a two-week Capacity Building Workshop on "Interdisciplinary Remote Sensing, Modeling, and Validation of Environmental Processes" at the Kwame Nkrumah University of Science and Technology (<https://www.knust.edu.gh/>), in Kumasi, Ghana in West Africa. The Workshop was sponsored by the international Committee On Space Research (COSPAR, <https://cosparhq.cnes.fr/>), with supplementary support from the African Development Bank (<https://www.afdb.org/en/>), and the West African Science Service Center on Climate Change and Adapted Land Use (WASCAL, <http://www.wascal.org>), which also provided logistical support for the Workshop. In addition to these four scientists, there were six additional lecturers: three were from Europe and three from West Africa. There were 30 workshop participants from nine countries in West Africa (Benin, Burkina Faso, Gambia, Ghana, Mali, Niger, Nigeria, Senegal, Togo); most were Ph.D students, and others were at various levels in their professional careers (academic or other).

New Hires

GESTAR welcomes the following members:

Fei Liu, Research Scientist

Joshua Masters, Science Animation Fellow

Perry Oddo, Support Scientist

Lauren Ward, Earth Science Video Producer

Carol Ball, Project Specialist

Prior to joining GESTAR, **Carol Ball** worked at USRA HQ in Program Development, providing support for proposal

editing, color team logistics, production, and consultant interface; organizing HQ and program presence at annual conferences, and assisting in the development of various STEM K-12 efforts. With GESTAR, she is providing operational support in security processing, proposal and grant writing, seminar series contractual and travel accommodations, event planning, and other areas. She can be found in Room H102, Building 33. Be sure to stop by and say hi!

AVHRR Deep Blue aerosol data set released

Andrew Sayer (613/USRA) has been working primarily on the 'Deep Blue' aerosol project, led by his sponsor N. Christina Hsu, since the beginning of the GESTAR cooperative agreement. Deep Blue (DB) uses satellite measurements from various instruments to determine aerosol loading globally (e.g., from mineral dust, sea spray, wildfire smoke, volcanic ash, industrial haze). Monitoring aerosols is important for applications such as hazard avoidance, air quality/human health, and climate change.

This past spring, the team released version 1 (V001) of the AVHRR (Advanced Very High Resolution Radiometer) Deep Blue aerosol data set. This uses versions of their DB over-land and Satellite Ocean Aerosol Retrieval (SOAR) over-water algorithms, adapted from the prior application of DB and SOAR to sensors including as the Sea-viewing Wide Field-of View Sensor (SeaWiFS), Moderate Resolution Imaging Spectroradiometers (MODIS), and Visible Infrared Imaging Radiometer Suite (VIIRS).

The AVHRR satellite record spans almost 40 years, and this new data set demonstrates for the first time the potential for retrieving aerosol loading over land from this sensor, a major new capability. Up to now, over-land retrievals from DB and similar algorithms have only been available from the late 1990s onwards. So, this significantly extends the available data record back in time, allowing scientists to, for example, probe quantitatively how aerosols over land changed during the 1980s and 1990s when western countries were beginning to clean up and Asian countries began their period

of rapid economic development. While aerosol data have been derived from AVHRR over oceans before, the application of SOAR to the AVHRRs provides consistency in approach with that of more modern sensors. Sensor-to-sensor consistency and stability is crucial for trend analysis.

Dr. Sayer led the development of over-ocean aerosol retrievals in the new data set. He also assisted in over-land retrievals and performed validation and intercomparison exercises on both the land and ocean data to demonstrate that the retrieval techniques perform well. This work is documented in two studies in press in the *Journal of Geophysical Research* (Hsu et al., 2017, doi:10.1002/2017JD026932, and Sayer et al., 2017, doi:10.1002/2017JD026934), which are also the subject of an upcoming Research Spotlight in *EOS*, AGU's magazine.

Version 1 consists of data from the following platforms: NOAA18 AVHRR data from 2006 to 2011; NOAA14 AVHRR data from 1995 to 1999; NOAA11 AVHRR data from mid-1989-mid-1991. The data set and a product user guide are available through the NASA Center for Climate Simulation (NCCS) data portal at <https://portal.nccs.nasa.gov/datashare/AVHRRDeepBlue> or <ftp://dataportal.nccs.nasa.gov>. Access is free and does not require registration. Additional information is available at the project's website, <https://deepblue.gsfc.nasa.gov>. The PI of the effort is N. Christina Hsu; Jaehwa Lee, and Andrew Sayer are the other scientists involved. (Note, the editor thanks Dr. Sayer for contributing to this highlight.)

maniac talk

GESTAR thanks the following scientists who recently presented talks: Dr. Michelle Thaller, Asst. Dir. Of Science for Communications, NASA/GSFC (March); Sara Ann Tangren, Agent Associate, University of Maryland Extension (April); Dr. J. Vanderlei Martins, Professor, Dept. of Physics, UMBC (April); Dr. Peter Pilewskie, University of Colorado - Boulder (May); and Dr. Arthur "Fritz" Hasler, NASA/GSFC, Code 612 (Emeritus) (June).

Maniac Talks are available online at the SED Highlights page: <http://science.gsfc.nasa.gov/sed/>. Thanks again to **Charles Gatebe** and **Bill Hyrbyk** for their ongoing efforts with these events.

Moving On

Ed Celarier

Clara Draper

SuengKuk Lee – University of MD, College Park

Allison Leidner – NASA/Arctic Slope Regional Corp.

Lisa Poje

David Trossman – Research Assoc., Univ. of TX - Austin

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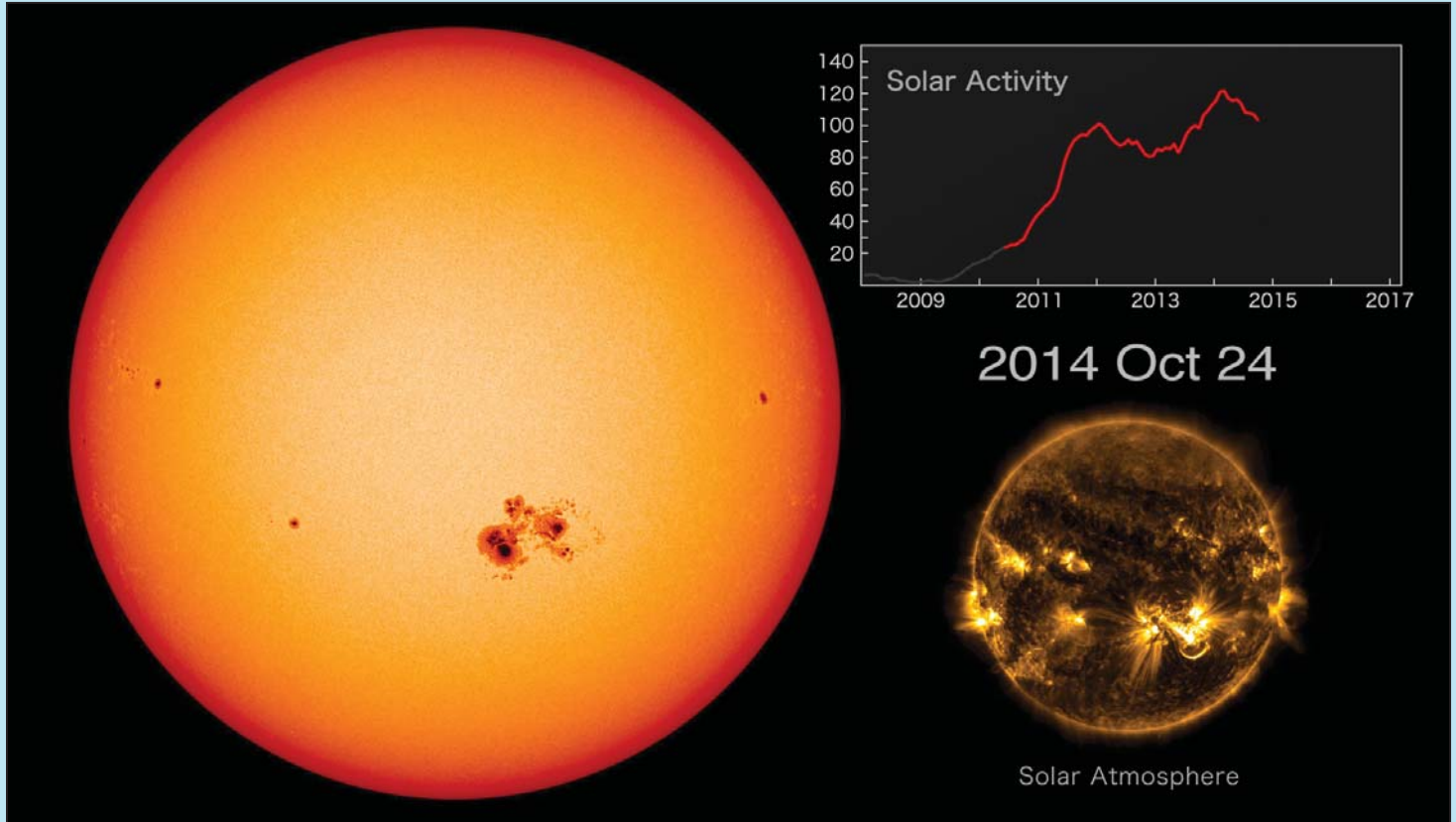
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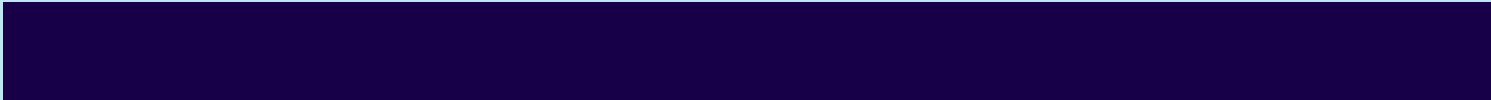
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Video Highlight: SDO Anniversary Series



This highlight covers Years 1-7 of the Solar Dynamics Observatory in detail. Visit <https://svs.gsfc.nasa.gov/12614>. **Scott Wiessinger** (130/USRA), Lead Producer; **Genna Duberstein** (130/USRA), Producer; **Tom Bridgman** (606.4/GST), Lead Visualizer; and Karen Fox (ASI), Writer. Credit: NASA Goddard Space Flight Center.



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