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Science Applications of Planet Data

Planet has invested in a rigorous, science-first platform, producing an unprecedented volume of calibrated remote sensing data — approximately 25 TB per day. Across the scientific community, from universities to NASA, ESA and the German Aerospace Centre, students and researchers have used Planet data to publish over 1,700 journal and conference papers, and have presented scores of talks and research seminars at academic conferences.

BIOSPHERE
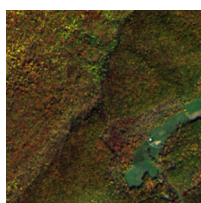
Professor Jin Wu and his team at the University of Hong Kong study forest phenology — the rhythms and periods of life. Aided by the high revisit rate of Dove satellites, Wang et al. (2020) detected dry season vegetation patterns in the Amazon: many tropical trees drop all or some of their leaves in the dry season, then flushing new young growth in bursts. The causes and consequences of these patterns remain poorly understood, but have enormous implications for forest ecology and the relationships between forests and climate. Using MODIS data fused with Planet imagery, they explored fine variations in dry season green up (flushing) and brown down (leaf loss). These methods have the potential to dramatically improve biodiversity mapping with satellite imagery.

GEOSPHERE
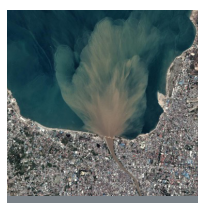
In September 2018, a magnitude 7.5 earthquake struck Sulawesi, Indonesia. The shaking liquified the soil, leading to destructive landslides and a death toll over 4,000. A multinational research team spanning four continents, led by Dr. Kyle Bradley at the Earth Observatory of Singapore, utilized PlanetScope imagery to map ruptures and landslides from the quake. They discovered that the landslides were largely the result of rice farming practices in the area. "We were able to use PlanetScope images captured directly before and after the earthquake, which allowed us to…isolate the landsliding caused by ground shaking," Bradley explains. In the study, Bradley's team highlights the need for more proactive assessment of the potential hazards caused by farming and irrigation.

ATMOSPHERE
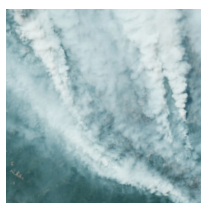
There is a high demand for localized, fine-scale information on $PM_{2.5}$ air pollution. Satellite imagery has the potential to play an important role in tracking these pollutants, which pose a serious health risk. Zheng et al. (2021) used PlanetScope imagery with a machine learning pipeline to generate daily ground level estimates of $PM_{2.5}$. This methodology can help identify local $PM_{2.5}$ hotspots and track variations over time. They focused on Beijing and Delhi, two of cities with the world's highest concentrations of $PM_{2.5}$. This methodology uses the visual appearance of features such as buildings as a proxy for haziness in the images combined with information on meteorological conditions in the metadata to track $PM_{2.5}$ levels.

CRYOSPHERE
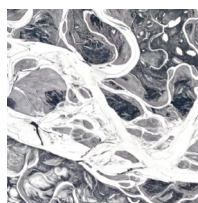
In Arctic and boreal regions, climate change is causing warming at twice the global average rate, leading to widespread changes to delicate ecosystems. One method for monitoring the impact on these ecosystems is to look at their gross primary production (GPP). Catherine Kuhn and colleagues from NASA's Arctic Boreal Vulnerability Experiment (ABoVE) used PlanetScope, Sentinel-2, and Landsat 8 data along with aerial imagery to estimate the GPP of small lakes in Alaska. By combining remote sensing imagery with oxygen isotope measurements from lakes in their study area, they were able to create a model to estimate GPP by analyzing the color of each lake in the imagery. "Shallow lakes are abundant worldwide and therefore the ability [to measure] GPP is crucial," the authors state, looking to expand their study area in the long term.

PLANET DATA ACCESS OPTIONS FOR RESEARCHERS

Education & Research Program

Through our Education and Research Program, Planet provides university access to PlanetScope and RapidEye imagery (up to 5,000 km²/month) for non-commercial research applications by application.

The Education and Research Program hosts more than 10,000 users across 70 countries and more that 1,000 universities. To access this data souce, users can apply at go.planet.com/research.

NASA Commercial SmallSat Data Acquistion (CSDA) Progam

Through this program, all researchers funded by a U.S. federal civilian agency or the National Science Foundation have access to Planet's vast archive of PlanetScope and RapidEye imagery for scientific use and Earth science applications for societal benefit. For more information on the program and how to apply, visit go.planet.com/nasa.

European Space Agency Earthnet Program

Any researcher, including nonprofit researchers and those at government institutions or non-commercial early adopters, may apply for access to PlanetScope, RapidEye and SkySat imagery through the European Space Agency Category 1 Portal.
Visit www.planet.com/earthnet.

RapidEye Science Archive (for German Researchers)

Any German researcher, including nonprofit researchers and those at government institutions, may apply for access to PlanetScope, RapidEye and SkySat imagery through the RapidEye Science Archive.
Visit www.planet.com/resa.

Norway's International Climate and Forest Initiative (NICFI)

Through Norway's International Climate & Forests Initiative, anyone can now access Planet's high-resolution, analysis-ready mosaics of the world's tropics in order to help reduce and reverse the loss of tropical forests, combat climate change, conserve biodiversity, and facilitate sustainable development. For more information on usage terms and how to apply, visit www.planet.com/nicfi.

Read our 2020-2021 Science Applications eBook

go.planet.com/science2021 or scan the QR code.

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