

Novel Steel Industry Flaring Capability at Payne Institute

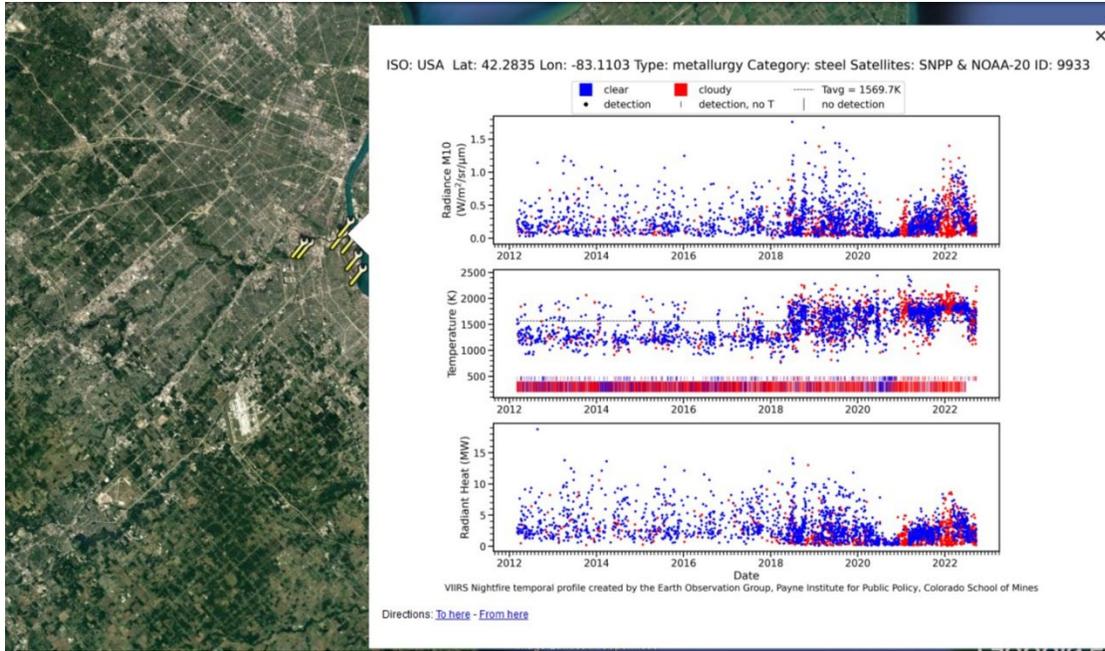
By Christopher Elvidge, Mikhail Zhizhin, Kelly Taber and Morgan Bazilian

The Payne Institute Earth Observation Group (EOG) at Colorado School of Mines has developed a new method for detecting flaring at industrial sites with the capability to produce worldwide data on steel mills.

This data is relevant for policy-makers, non-governmental organizations, and industry leaders seeking innovative [Green Steel](#) solutions; traditional steel manufacturing produces more CO₂ emissions than any other heavy industry. Recently at the [Clean Energy Ministerial](#) in Pittsburgh, global banks representing \$23 billion signed on to invest in [Sustainable STEEL Principles](#) in collaboration with the [Net-zero Steel Initiative](#) and the [United Nations Finance Programme Initiative](#).

EOG scientists, renowned for [Global Gas Flaring](#) research, are now utilizing satellite imagery to analyze steel facilities at a site-specific and regional or country-level basis. Flaring at [natural gas facilities](#) is studied with the Visible Infrared Imaging Radiometer Suite (VIIRS) satellite, which monitors and measures radiant heat intensity emissions including CO₂ and methane equivalent totals. [VIIRS](#) Nightfire (VNF) is unique in the recording of near-infrared and short-wave infrared data at night and a powerful tool to track [climate change](#).

New EOG research and publications will be forthcoming showing year-over-year comparisons and changes to steel production due to global and geo-political factors. For example, steel production levels decreased during the global Covid-19 pandemic. Russia's invasion of Ukraine shuttered Ukraine's steel plants, disrupted exports, increased market volatility, and hindered [sustainable steel](#) efforts. Profile views of more than 1,000 steel mills from across the globe have been developed. Scientists [Chris Elvidge](#) and [Mikhail Zhizhin](#) are leading the EOG steel research initiative.



Profile of Detroit, MI steel facilities showing a drop in production in 2020 due to the Covid pandemic.

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ABOUT THE AUTHORS

Christopher Elvidge

Senior Research Associate, Director of Earth Observation Group

Christopher D. Elvidge has decades of experience with satellite low light imaging data, starting in 1994. He pioneered nighttime satellite observation on visible lights, heat sources including gas flares and wild fires, as well as bright lit fishing vessels. He led the development of these nighttime remote sensed products with images from DMSP, JPSS, and Landsat satellites. These data are very popular and used globally in both public and private sectors. As of February 2018, he has more than 11,000 scholarly publication citations.

Mikhail Zhizhin

Research Associate, Earth Observation Group

Zhizhin Mikhail Nikolaevich, M.Sci in mathematics from the Moscow State University in 1984, Ph.D. in computational seismology and pattern recognition from the Russian Acad. Sci. in 1992. Research positions from 1987 to 2012 in geophysics, space research and nuclear physics at Russian Acad. Sci., later at NOAA and CU Boulder. Currently he is a researcher at the Earth Observation Group at Colorado School of Mines. His applied research fields evolved from high performance computing in seismology, geodynamics, terrestrial and space weather to deep learning in remote sensing. He is developing new machine learning algorithms to better understand the Nature with Big Data.

Kelly Taber

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Kelly Taber is a freelance writer specializing in research topics. She previously worked as an analyst and technical writer at the U.S. Department of Energy's National Energy Technology Laboratory in Morgantown, WV and received her master's degree in Communication Studies from West Virginia University and bachelor's degrees in Political Science and Journalism from University of Mary Washington. She began her career as an award-winning business reporter at newspapers in West Virginia and Virginia.

Morgan Bazilian

Director, Payne Institute and Professor of Public Policy

Morgan Bazilian is the Director of the Payne Institute and a Professor of public policy at the Colorado School of Mines. Previously, he was lead energy specialist at the World Bank. He has over two decades of experience in the energy sector and is regarded as a leading expert in international affairs, policy and investment. He is a Member of the Council on Foreign Relations.

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ABOUT THE PAYNE INSTITUTE

The mission of the Payne Institute at Colorado School of Mines is to provide world-class scientific insights, helping to inform and shape public policy on earth resources, energy, and environment. The Institute was established with an endowment from Jim and Arlene Payne, and seeks to link the strong scientific and engineering research and expertise at Mines with issues related to public policy and national security.

The Payne Institute Commentary Series offers independent insights and research on a wide range of topics related to energy, natural resources, and environmental policy. The series accommodates three categories namely: Viewpoints, Essays, and Working Papers.

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