

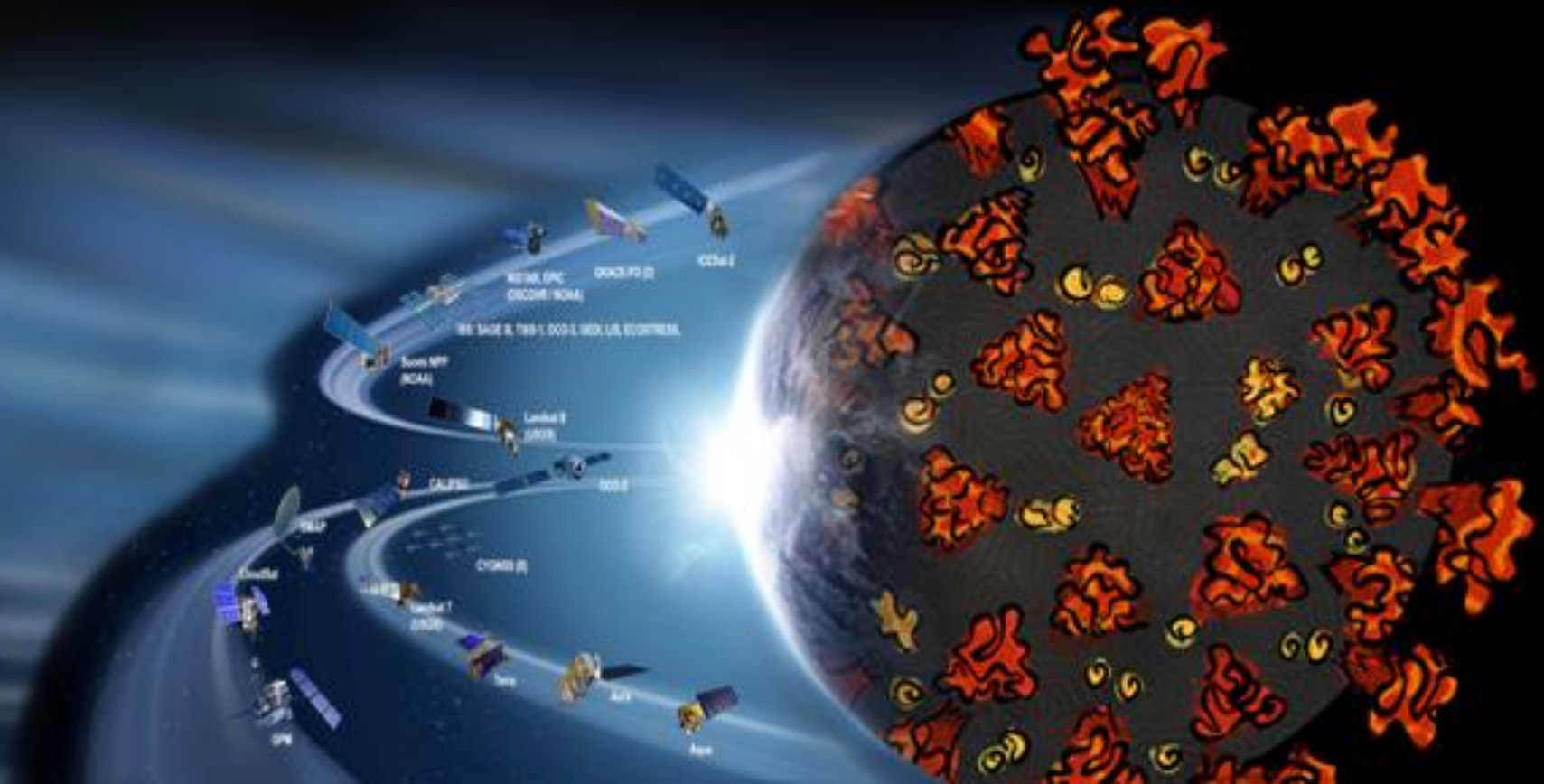
# KISS COVID-19 Virtual Study

David Schimel and Jessica

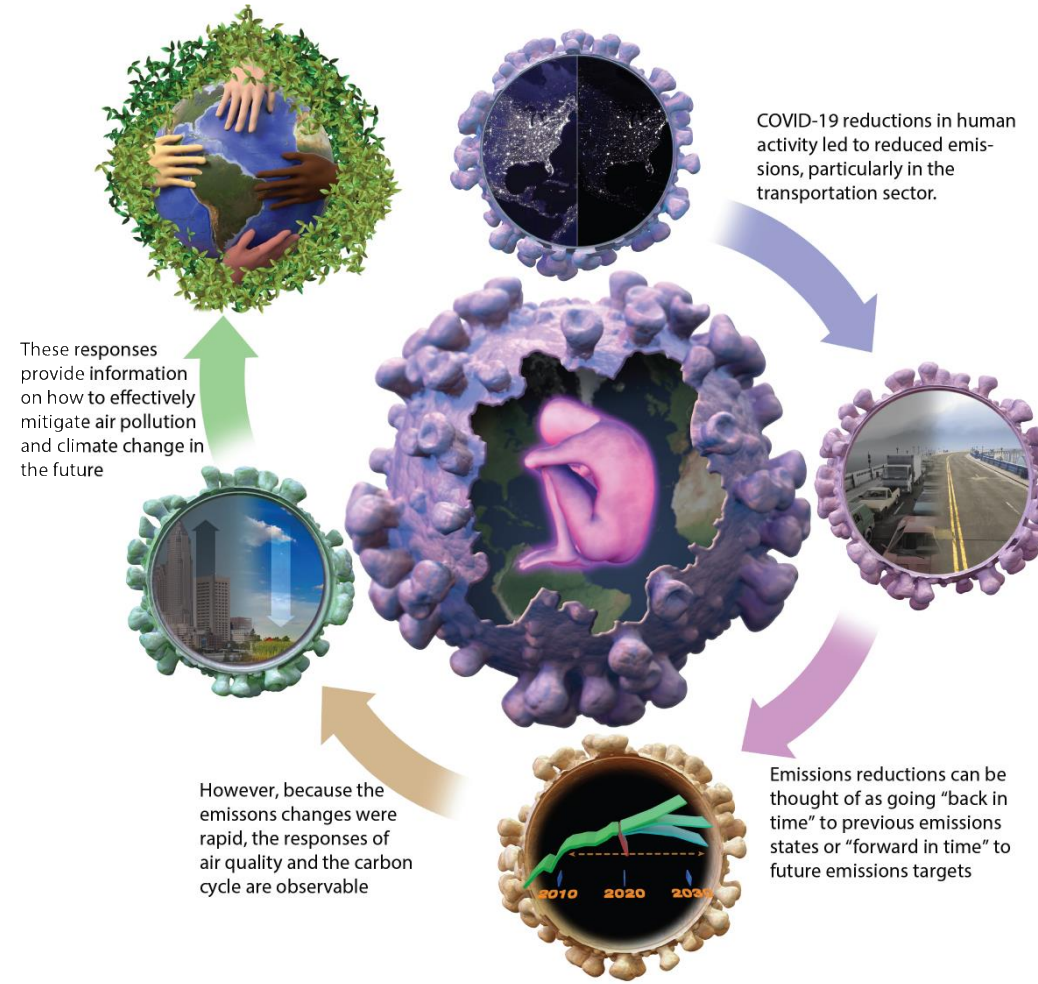
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Jet Propulsion Lab  
California Institute of  
Technology

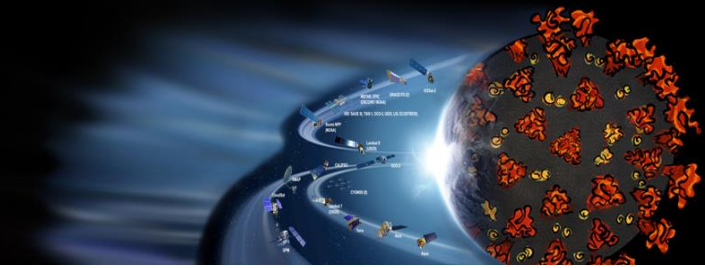
Paul Wennberg  
California Institute of  
Technology



# COVID effects on the Earth System



# What is KISS?



The Institute is a "think and do tank," whose primary purpose is to bring together a broad spectrum of scientists and engineers for sustained technical interaction aimed at developing new space mission concepts and technology. The Institute is centered on the intellectual, instrumentation, and research strengths of the California Institute of Technology and the Jet Propulsion Lab — and augments those strengths by inviting external experts from academia, government, and industry to engage in its programs. The Institute provides opportunities for graduate students and postdoctoral fellows to participate in cutting edge space mission research and learning. The Institute supports outreach to the public and the wider technical/scientific community via open lectures and the Internet.



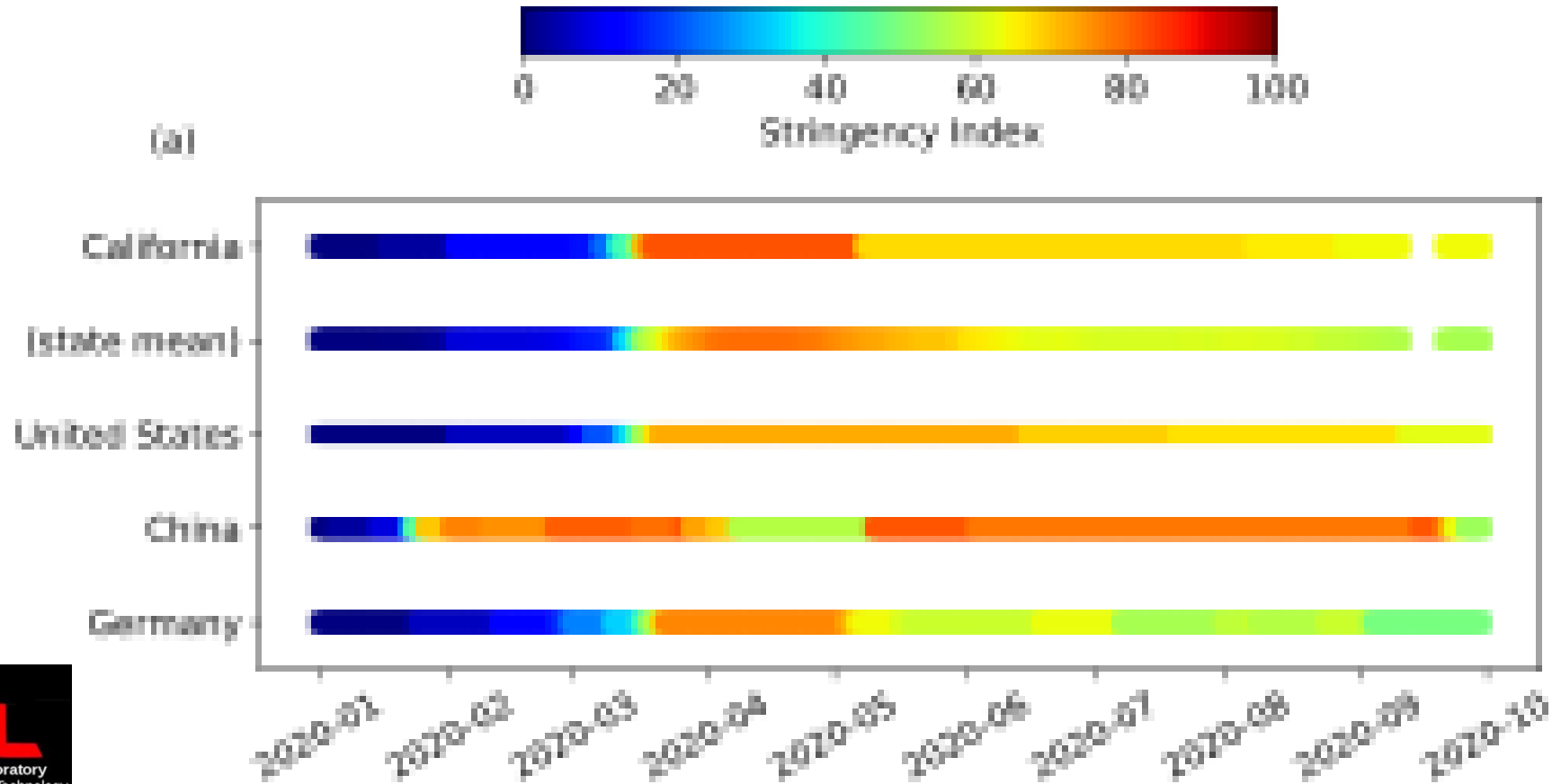
Michelle Iudd



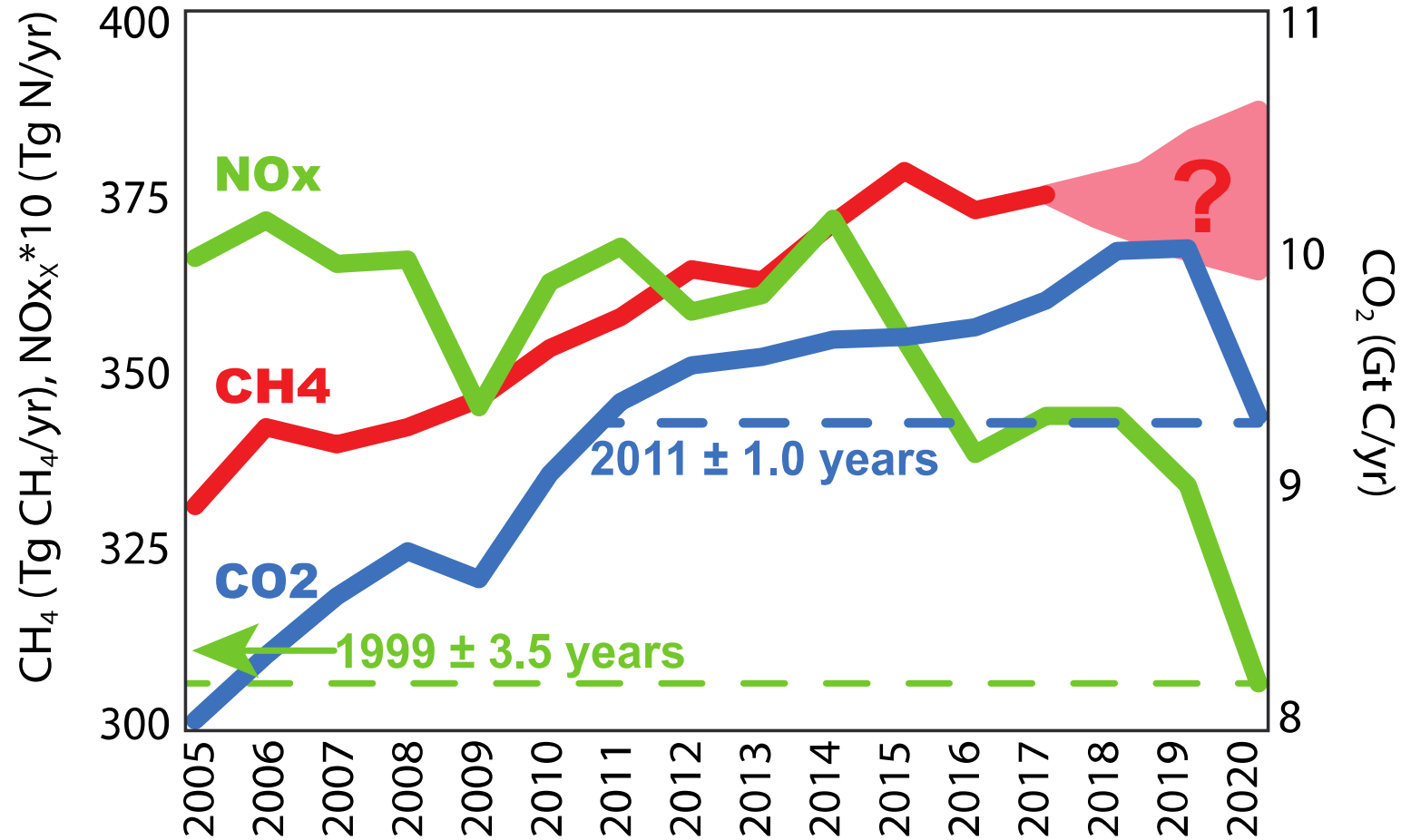
Tom Prince



# The cause: behavioral changes



# Time Travel: COVID Effects on Emissions



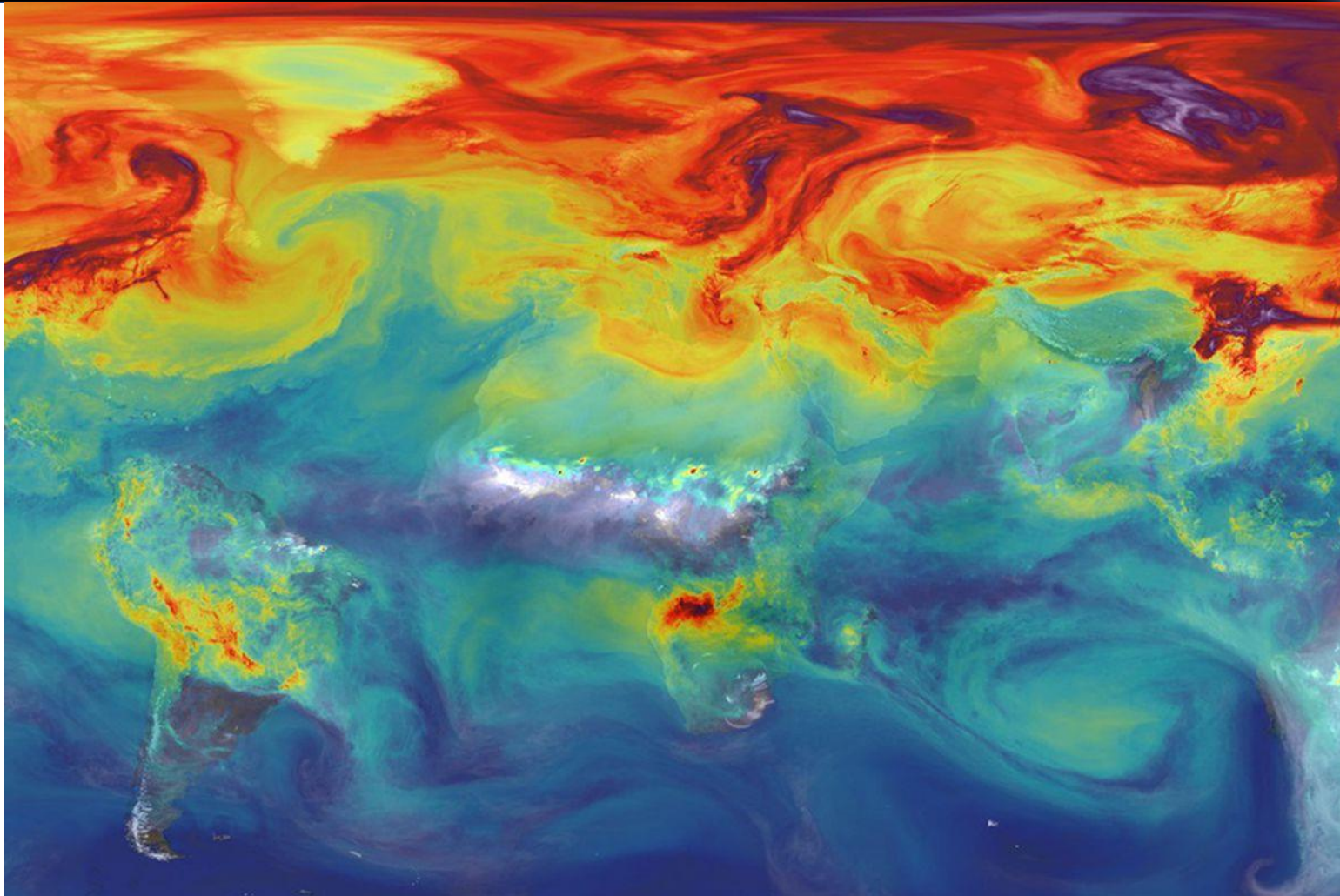
# Eye in the Sky

## The NASA Satellite Fleet Monitors the Earth's Vitals



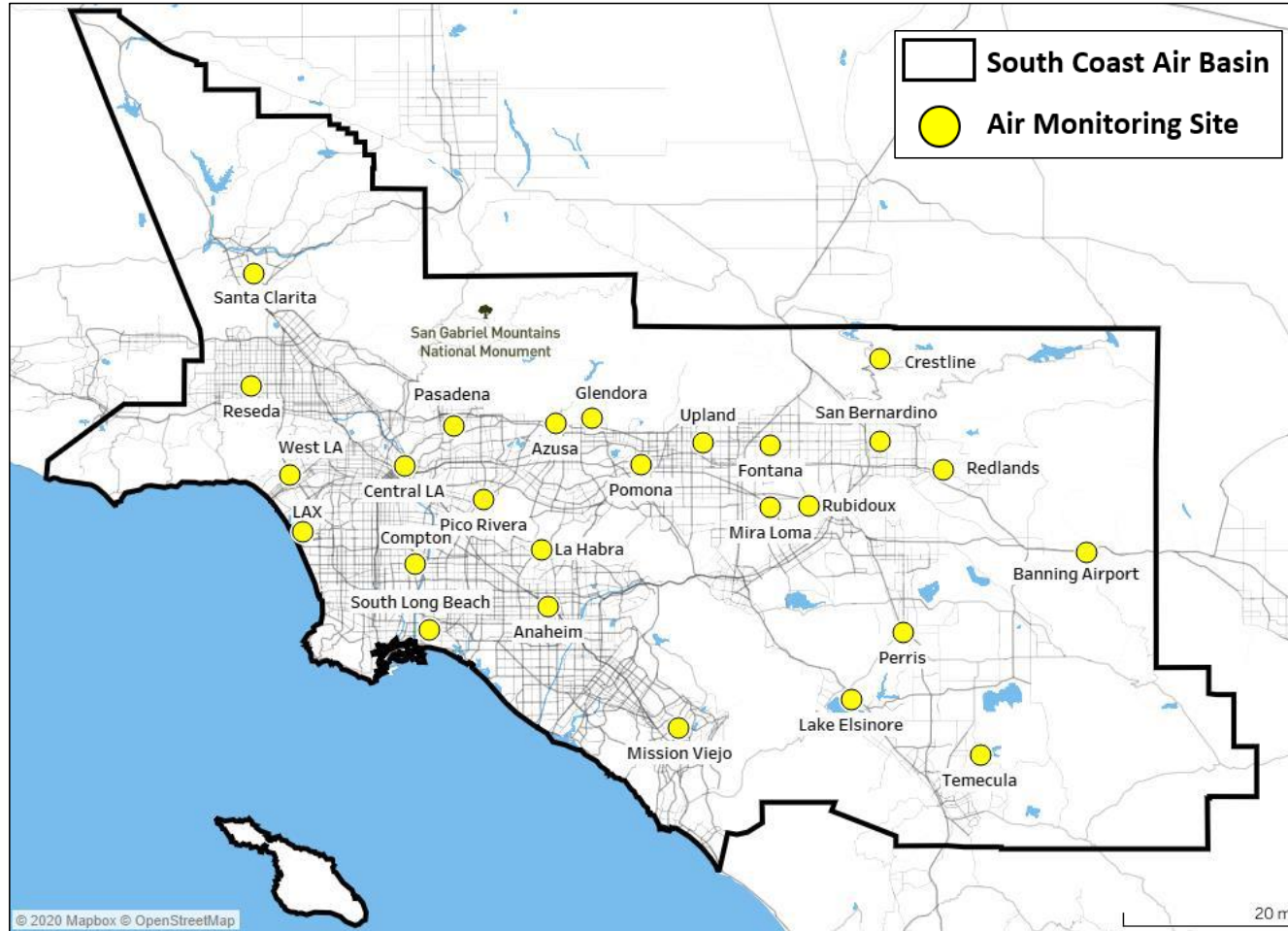


# CO<sub>2</sub> from Space



OCO-2, Jet Propulsion  
Lab, NASA

# Atmospheric Composition Networks Neighborhood by Neighborhood Information





# What did we learn?



- Air pollution and greenhouse gases are two sides of the same coin!
- The massive shutdowns only took us 9-20 years into the past of carbon and pollutant emissions, for CO<sub>2</sub>, the world needs to go back ~100 years.
- Epic personal sacrifice had comparatively small impact on carbon: mitigation requires reducing primary energy (electricity) and equitable impacts.
- **Mitigation of pollution and GHG requires systemic change.**

