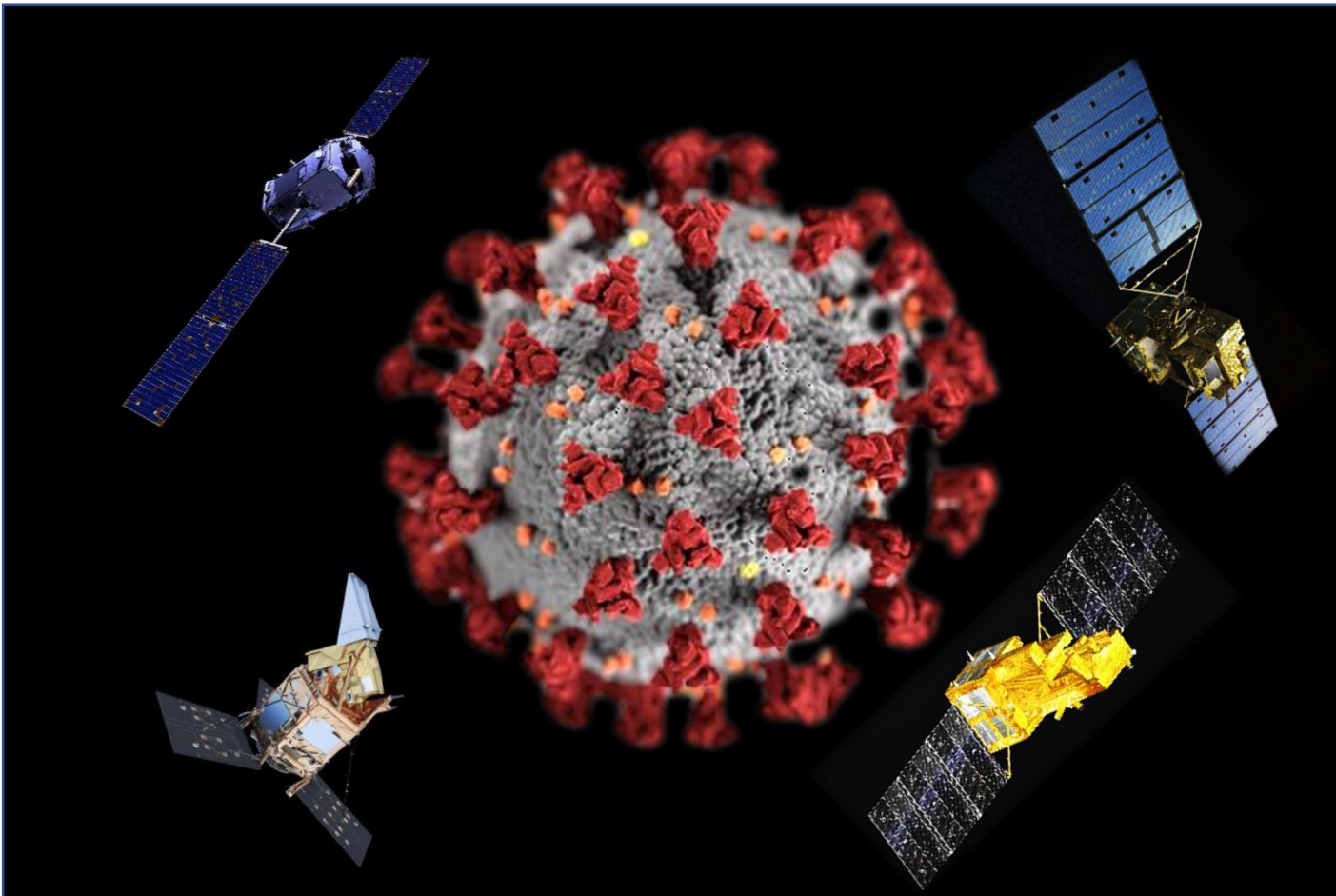

# COVID-19 and climate change science: Impacts, Options and Opportunities for knowledge sharing

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# COVID-19: Impacts, Options and Opportunities for knowledge sharing-A Space-Based Perspective

- Impacts of COVID-19 on greenhouse gas emissions and the climate system?
  - COVID-19 lockdowns caused significant (~10% Jan-Apr), but temporarily reductions in fossil fuel use
    - introducing large (~50%) reductions in short-lived air pollutants, such as nitrogen dioxide ($NO_2$)
      - See Le Quéré et al., Nature Climate Change (2020); Liu, Z., et al., arXiv preprint arXiv:2004.13614 (2020)
    - reducing the $CO_2$ grow rates, but producing very small (< 0.5 ppm or 0.1%) localized reductions in $CO_2$, due to its much longer lifetime (centuries) and large background concentrations (415 ppm)
- Impacts of COVID-19 on the scientific research and systematic observation?
  - Space-based environmental measurements continued, largely without interruption
    - Some supporting ground-based and airborne campaigns, lab work and integration and test activities have been simplified, delayed, or canceled, while other have proceeded on schedule with strict work changes
    - Most ground stations, mission operations, and data handling systems have continued to operate reliably
  - Some scientific activities (science team meetings, workshops, conferences, training, outreach) have been delayed or cancelled, while others have been replanned to more fully exploit rapidly-expanding virtual meeting, training, and cloud-based data exchange capabilities
    - i.e. https://www.europeanweather.cloud/ ; https://padlet.com/TrainingEUMETSAT/zhx4z4ky9yktmazc; https://carbon.nasa.gov/pdfs/Virtual%20Panel_Complete%20Slides.pdf

# COVID-19: Impacts, Options and Opportunities for knowledge sharing-A Space-Based Perspective

- Options and opportunities to enable scientific support for a resilient recovery and for knowledge sharing?
  - Global, space-based observations are being monitored and analyzed as global tracers of changes in economic activity during the slowdown and initial recovery
  - The COVID-19 slowdown and recovery provides an unprecedented opportunity for assessing, refining and improving tools for tracking and quantifying the impacts of these activities on the environment
    - Air pollution, greenhouse gas emissions, traffic, shipping, air travel
  - Space agencies are soliciting research that targets COVID-19 impacts and recovery efforts
    - NASA's Rapid Response and Novel Research in Earth Science (https://www.nasa.gov/feature/goddard/2020/nasa-funds-four-research-projects-on-covid-19-impacts) and contributions to the COVID-19 High Performance Computing Consortium; https://www.xsede.org/covid19-hpc-consortium)
    - EC and ESA are offering Copernicus infrastructure and additional resources (https://www.copernicus.eu/en/events/events/european-commission-esa-press-conference-race-initiative)
  - NASA, ESA, CSA, and JAXA co-sponsored a COVID-19 Virtual Hackathon on 30-31 May to engage the public to use space-based data to assess impacts and implement recovery efforts
    - https://www.nasa.gov/press-release/nasa-partners-launch-virtual-hackathon-to-develop-covid-19-solutions