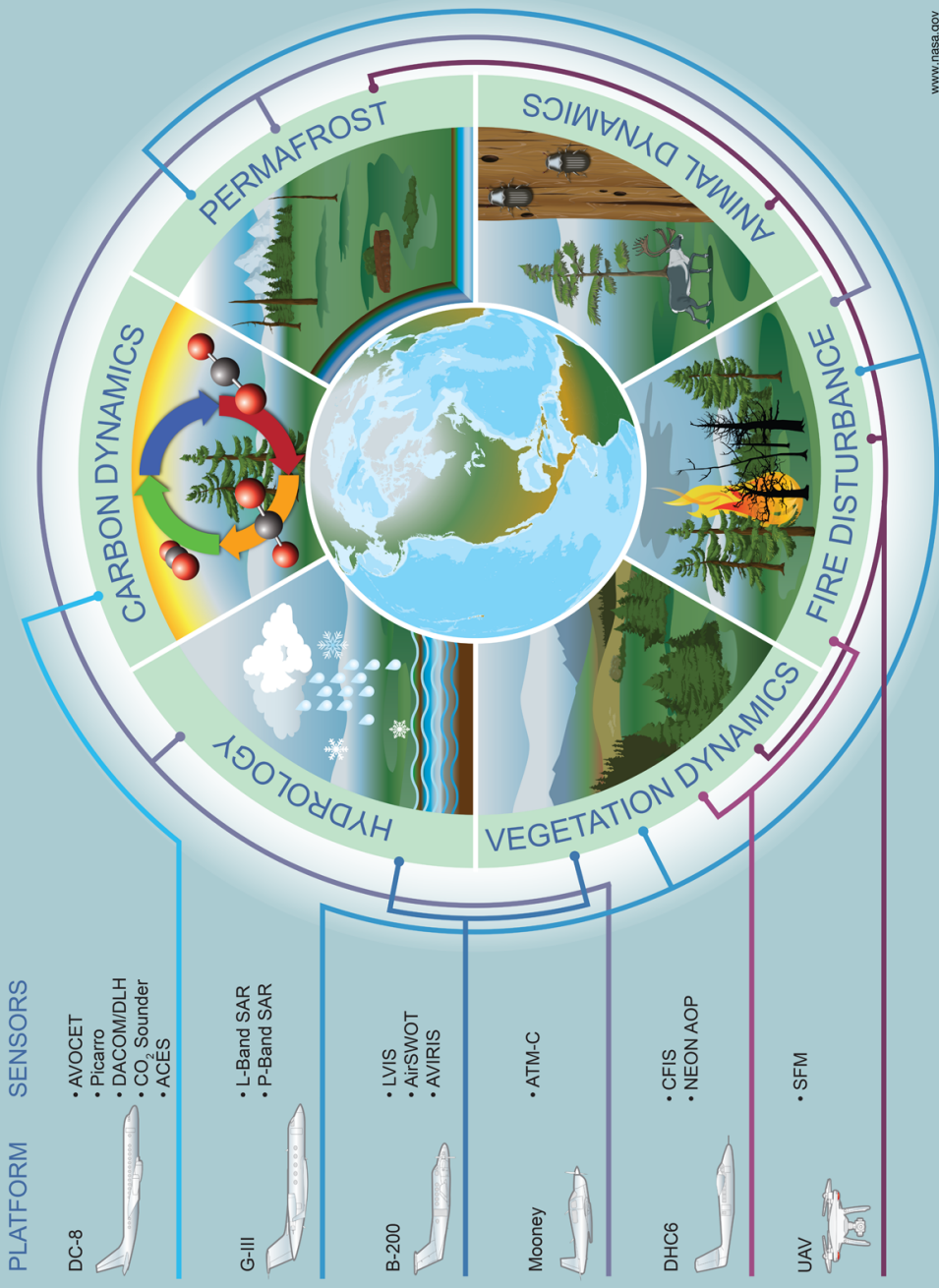


AIRCRAFT, SCIENCE AND ABOVE

NASA's Arctic-Boreal Vulnerability Experiment (ABOVE) campaign used aircraft to measure landscape-scale changes in vulnerable arctic-boreal ecosystems that satellites and ground instruments alone could not.



National Aeronautics and Space Administration



HOW MIGHT EARTH BEHAVE IN A WARMER WORLD?

Rapidly evolving landscapes like the arctic-boreal ecosystems of Alaska and western Canada provide real-time examples of how seasonally frozen landscapes adjust to a changing climate. ABOVE aircraft used their unique perspective to help us understand the regional-scale changes in topography, vegetation and more that satellites and ground instruments can't see.

Here are three things we wouldn't know without ABOVE aircraft data:

- WILDFIRES ARE CHANGING THE ARCTIC-BOREAL LANDSCAPE:** Measurements aboard the G-III showed where wildfire had thawed permafrost, creating rougher, wetter terrain. This change could have local to global implications, including changes in the distribution and growth of local plant species to the regional acceleration of carbon dioxide (CO₂) and methane (CH₄) released into the atmosphere.
- WE'RE LEARNING WHAT "GREEN" MEANS:** Changes in NDVI, a measurement of vegetation greenness, indicate how ecosystems respond to changing environmental conditions. Data collected aboard the B-200 are teaching us how to better interpret NDVI in tundra and boreal ecosystems where high NDVI values could mean high concentrations of either moss or vascular plants. This distinction could have wide-ranging consequences for everything from water and carbon fluxes to future fire disturbances.
- AIRCRAFT CAN HELP US DETERMINE CO₂ AND CH₄ FLUXES ON LARGE AND SMALL SCALES:** Instruments aboard the DC-8 and Mooney observed increases in CH₄ from bacterial respiration and decreases in CO₂ from plant photosynthesis near the surface of the Earth. The DC-8 also detected large-scale boundary condition concentrations of the two gases above the Arctic Ocean. Large changes in CO₂ and CH₄ impact on how our planet regulates temperature.