PAVICS

Streamlining climate science research

The earth's climate is changing. Researchers, policy makers, and practitioners of all kinds have been using climate models' outputs for decades to understand the fundamental processes driving this change and to predict what aspects of our climate will be affected when, and by how much.

The latest climate models create three-dimensional representations of our climate based on long-term changes in numerous drivers, such as greenhouse gas levels, the sun's output, aerosols concentrations, and volcanic eruptions. These models create massive datasets that form the basis of climate projections and help predict our environmental future. As models become more sophisticated with increased resolution and as more global research institutions contribute new algorithms, models, and measurements, managing climate data becomes a challenge that steals precious time away from critical research. This is why Quebec-based Ouranos, a consortium on regional climatology and adaptation to climate change, partnered with the Computer Research Institute of Montreal (CRIM) to create an innovative research software platform to streamline climate science research.

Turning raw data into useful information

The Power Analytics and Visualization for Climate Science (PAVICS) platform standardizes many different formats of data generated from various climate models, allowing organizations around the world to efficiently pool their data and tools. It acts as a climate data repository, saving each individual institution the transfer, effort, and storage necessary to maintain massive historical datasets and model-generated information. It allows researchers to treat and analyze climate model outputs and transform data into usable climate information via a network of supercomputers, distributing the computing load as well as improving the quality and reproducibility of the studies.

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PAVICS accelerates climate research and climate-scenario development and improves the quality of the research by centralizing the collection, reformatting, scrubbing, and management of the data. It also helps increase the quality and diversity of standardized climate outputs through open collaboration. Researchers who develop specific techniques are encouraged to donate their algorithms to a shared library, making them accessible to all users.

Keeping Canada at the forefront of climate research

While climate change data and predictive models are essential for climatologists to understand the complexities of the earth's climate and plan for future challenges, they aren't just for climatologists. The applicability and benefit of the PAVICS platform extends widely to educators, governmental policy officers, agricultural consultants, water managers, forestry planners, municipal engineers, and other stakeholders. PAVICS also helps Canadian researchers contribute and be integral to climate change studies occurring in Europe and elsewhere, ensuring that Canada maintains our role as a world-class research nation.

Cycle of important contributions

PAVICS is funded through CANARIE's Research Software Program and builds on existing software services available throughout the global

community such as Birdhouse (tools for climate data analysis) and PyWPS (an implementation of the web processing service standard from the Open Geospatial Consortium). It will contribute back to CANARIE's ever-growing Research Software Registry a climate bias correction service, a climate indicator calculator, a high-resolution spatial grid renderer, and a spatial and temporal data slicing service, helping maximize the impact and reach of publicly funded research.

Platform: PAVICS

Description	The Power Analytics and Visualization for Climate Science (PAVICS) platform streamlines workflows for climate scientists. Running on networked supercomputers, this platform relieves individual scientists of the burden of fetching and archiving multi-terabyte sized datasets and provides parallel computation tools to analyze and visualize large volumes of climate data.
Contributor(s)	Ouranos and CRIM
Research Subject	Climatology
Portal	pavics.ouranos.ca
Portal Access	Public
Supports Separate Projects	Yes
Citizen Science	Yes
Software License	Open source (BSD-like)
To Learn More	https://science.canarie.ca/res/103