

Passerelle Forêt-Climat: a Data Portal for the Largest Academic Forest in the World

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1. FINDING A HOME FOR DATA

Data stewardship tactically coordinates and implements data management to ensure the accessibility of high-quality data in an organization. It is now an area of focus at Laval University, which has been overseeing forestry and research operations at Montmorency forest for over 60 years. Located 75km north of Québec city, Canada (Figure 1), it is the largest experimental forest in the world at 397 km² and hosts a federal weather station.

We created an online portal called Passerelle Forêt-Climat to address three targeted needs:

1. Fast and reliable accessibility and sharing of data with collaborators within the institution, country, and internationally.
2. Spatial, temporal, and real-time data visualization.
3. Access to on-premises data analysis and a network of high-performance computing (HPC) facilities.

2. A WEB PORTAL POWERED BY ESRI

The online portal runs on a local Dell server (specifications in Table 1) and is powered by Esri ArcGIS Enterprise, which is comprised of four ArcGIS components: Web Adaptor, Portal, server, and Data Store. Data sharing, visualization, and analysis can be done directly in the web interface or locally on the user's personal computer using ArcGIS Pro. Heavier workloads can be sent to any HPC facility in Canada or the world that are connected to high performance networks such as RISQ and CANARIE.

3. MAKING SMART FORESTS SMARTER

Along with the online data platform, we filled the technological gap in the research done at Forêt Montmorency by acquiring sensors and equipment that will improve our understanding of the long-term ecological and societal impacts of forest harvesting. Additionally, new research projects created with this funding will allow empirical testing of theoretical models of complex processes, such as the relationship between forest management strategies and carbon balance, and their potential for climate change mitigation [1, 2].

Lastly, the introduction of real-time data will broaden the scope of research that can be done in a forested environment and will benefit research projects focusing on machinery, artificial intelligence, and digital twins. It will also serve as a learning gateway for the general public.

Table 1. Technical details of the local server

Component	Vendor	Details
Server	Dell	PowerEdge R750XA
CPU	Intel	4x Xeon Gold 6338
GPU	Nvidia	4x A40 + 4x A100 80GB
Storage	Dell	2x 7.68TB SSD ISE Read intensive 12Gbps
RAM	Dell	2x 64GB RDIMM 3200MT/s
Network	Broadcomm	57508 Dual Port 100GbE
Operating system	Linux	Rocky Linux 9
Software	Esri	ArcGIS Enterprise 10.9



Figure 1. Location of Montmorency experimental forest, 70 km north of Université Laval, Québec, Canada.

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