

Ocean Data Centers: Getting Ready for Machine Learning and Artificial Intelligence

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A UNIVERSITY OF VICTORIA INITIATIVE

Are Ocean Data Centers (OOI) Ready for ML and AI

There are potential gains of access and impact if large ocean data centers (like OOI) are ready and have the necessary structures and context to leverage the power of machine learning (ML) and the emerging industry of artificial intelligence (AI).

Some Definitions:

Machine Learning: Leveraging the ability of “trained” computers to explore and extract information from large and diverse data types. E.g. Detection and Classification (DC) of passive acoustic signals.

Artificial Intelligence: Self organizing information assessment that leverages computers to mimic the problem-solving and decision-making capabilities of an educated human mind (e.g. a post-doc).

A Brief (Recent) History

Machine Learning:

- Image analysis: searching for specific content (e.g. faces, fish)
- Acoustic analysis: searching for specific signals (e.g. whales)
- Text Analysis: recognizing text and understanding language

Artificial Intelligence:

- From the analysis of all images, understand content to generate and produce new images (e.g. art)
- From the analysis of all recordings, understand content to generate and produce new audio (speech, music)
- From the analysis of all text/information, understand context to generate and produce new text, new ideas, new interpretations, new information, new code
- From existing solutions, find new and innovative solutions to challenging problems (power is increasing 10x each year)

Advantage of Being ML and AI Ready

FAIR: Findable, Accessible, Interoperable, and Reusable

FAIR²: FAIR + Facilities that are Artificial Intelligence Ready



ML – will accelerate exploration of large data archives

AI – will accelerate discovery from large information archives

What might FAIR² look like?

- Interoperability is key, which means machine readable.
- Adding context will be essential, so that data are interpreted by the AI systems correctly. Prompt Engineering in Large Language Models
- Open Source code for manipulating OOI data

Goal: When might I expect to get a reasonable answer if I ask:

“When will the next eruption at Axial Seamount occur?”

ChatGPT 3.5's Answer



I'm sorry, but I cannot provide real-time or future predictions of specific events like volcanic eruptions. As of my last knowledge update in September 2021, I do not have information about the specific eruption schedule of the Axial Seamount or any other volcanic activity beyond that date. Predicting when a volcano will erupt is a complex task that requires continuous monitoring by experts in the field, and even they cannot predict exact eruption dates with certainty.

To find the most up-to-date information about the Axial Seamount or any other volcanic activity, I recommend checking with relevant geological and scientific organizations, such as the United States Geological Survey (USGS) or local authorities responsible for monitoring volcanic activity in the region. They will have the latest data and alerts related to volcanic activity. **But GPT 4.0 (or 5.0) might be able to “predict”**

ChatGPT 3.5's Answer



What is the present ocean temperature at axial seamount?

I'm sorry for any inconvenience, but I don't have access to real-time data, including current ocean temperatures at specific locations such as the Axial Seamount. Ocean temperatures can vary depending on the location, depth, and time of year. To obtain up-to-date information on ocean temperatures at Axial Seamount, you can consult resources like oceanographic research institutions, government agencies, or websites that provide real-time ocean data and monitoring. These sources often provide the most current and accurate data on ocean temperatures in specific areas.



What is the present air temperature at LAX?

I'm sorry for any inconvenience, but I don't have access to real-time data...

When did the CO₂ concentration at Mauna Loa first exceed 400 ppm?

The carbon dioxide (CO₂) concentration at Mauna Loa Observatory in Hawaii first exceeded 400 parts per million (ppm) on May 9, 2013. This milestone was significant because it marked the first time in human history that atmospheric CO₂ concentrations had reached such a high level. It served as a stark reminder of the ongoing increase in greenhouse gases in the Earth's atmosphere, which is contributing to global climate change. Since then, CO₂ concentrations have continued to rise and are closely monitored by scientists as part of efforts to better understand and address climate change.