The abstract should briefly summarize the contents of the paper in 150--250 words.

The abstract should contain approximately six sentences contained within a single paragraph. The first sentence typically begins with ``In this paper, we present'' which is then followed by what is presented in the paper. The second sentence is used to motivate the importance of what is presented and define the broad problem domain. Then, two to three sentences are used to state how the problem was solved. A single statement of the main result (singular) is then followed by a single statement of the main conclusion (singular).

In this paper, we present the use of a machine learning framework for the optimization of scientific ocean drilling data gathered from The JOIDES Resolution scientific drillship on behalf of the National Science Foundation (NSF) and The International Ocean Discovery Program (IODP). The IODP is an international research collaboration that coordinates seagoing expeditions to study the history of the Earth recorded in sediments and rocks beneath the ocean floor maintaining the data within a large repository for open access research. This study explores the IODP database utilizing sophisticated data science techniques to optimize the modeling processes of Earth's history as it is discovered in the ocean's subsurface. Much of the world’s history is contained in the oceans’ subsurface, and modern drilling technologies optimized with machine learning frameworks will provide statistically significant features for the modeling and interpretations of Earth's history can be made more efficiently with the aid of computational techniques. The research done utilizing IODP data will benefit greatly with an automated segmentation of features using a deep learning model orchestrated to extract features for use in Earth models. This study builds a Deep Neural Network (DNN) that mines and extracts important features from the IODP repository in an attempt to increase modeling accuracy and workflow efficiency during offshore drilling operations. A RNN will then be utilized against preprocessed DNN data in order to predict historic Sea Surface Temperature (SST) and the results will be compared to the modeling practices currently in use at IODP.

The Introduction follows the same general organization as the Abstract.

The Introduction should have approximately 8--10 paragraphs. The first paragraph is ``Motivation'' that states the broad problem and provides details as to why the problem is important. The second paragraph begins with the one sentence problem statement and then has 3--4 sentences adding details as needed. There should then be 3--4 paragraphs detailing the final approach used to solve the problem. Then a one paragraph summary of the main results followed by a one paragraph summary of the main conclusions. The last paragraph should contain an overview of the remainder of the paper organization.

Ocean drilling data used in today’s research of Earth’s past and present climate are used to build predictive models for the future climate of Earth with many features derived from past life and environmental characteristics contained within the sediments and rocks collected. Many of the exploration data collected are integrated parametrically and have been successfully used to describe the present however, with new technologies capturing data in near real-time and in high resolution it presents nonparametric relationships that make it hard for users to model the past and future with traditional statistical models. Lacking in these traditional methods is the ability to expand these relationships nonparametrically to other locations, such as onshore basins, offshore basins, different wells, and the emergence of fracking has introduced a growing need for more computationally powered modeling techniques .

We set out to define a build a Deep Neural Network (DNN) that mines The International Ocean Discovery Program (IODP) scientific drilling data for promising features that can be used in new Recurrent Neural Network (RNN) models when needed for highly-technical predictions of Earth’s history. Designing a flexible framework that allows for nonparametric mapping will enhance the user experience and allow for more sophisticated analysis of drilling data. Within the context of geoscience and data science, the one constant variable shared is change and the use of changepoints will be of great benefit to understand the variations recorded in the past and present, and model the predicted future of Earth’s dynamic processes.