

ABSTRACT

This poster details efforts in the University of Northern Iowa Geography Department to integrate Google Earth Engine into curriculum across multiple geospatial technology courses in 2019-2020. The work is ongoing and brief details are provided.

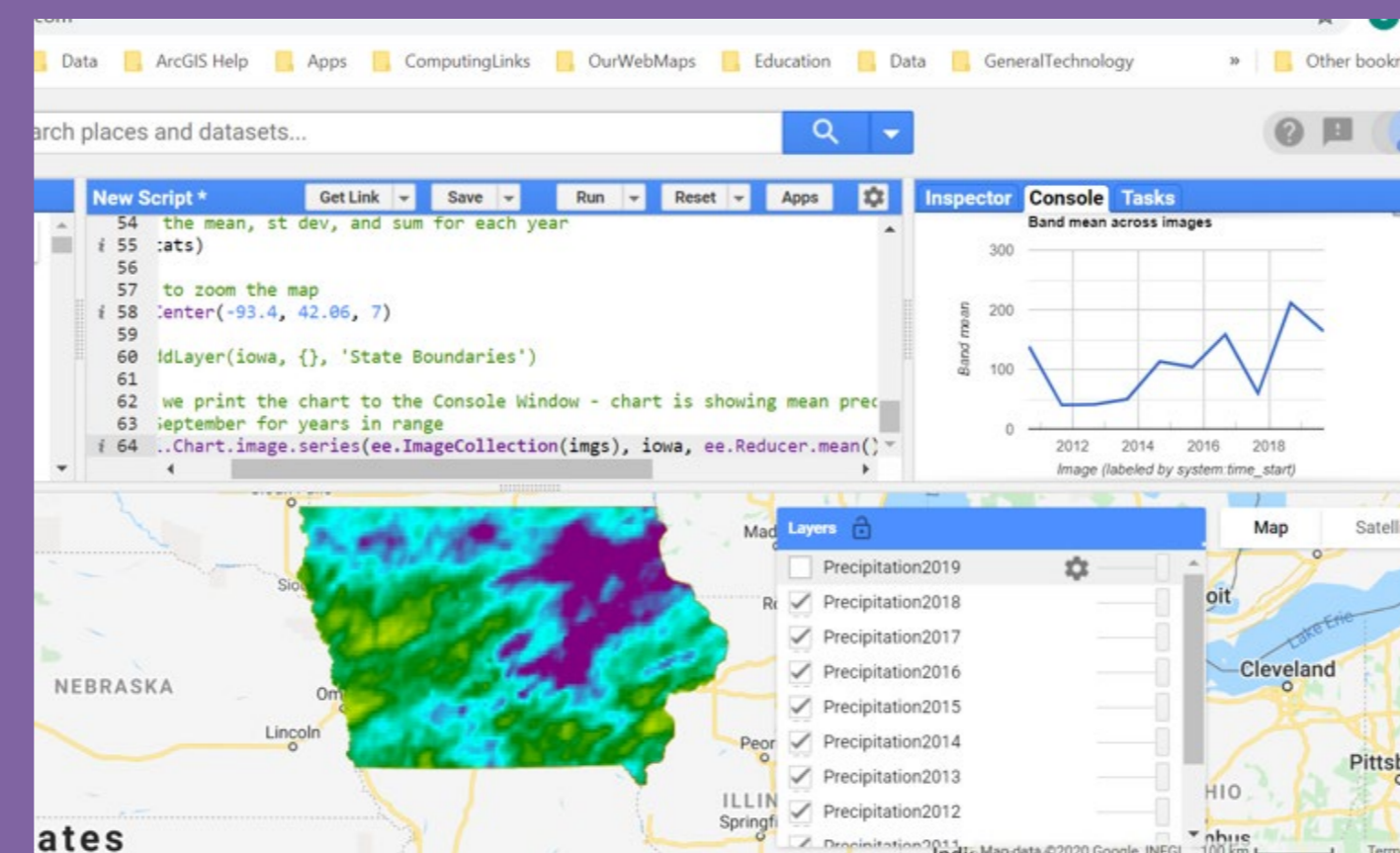
OBJECTIVES

Cloud-based computing has become a major driver in the geospatial technology realm. Google Earth Engine (GEE) (Figure 1) (<https://earthengine.google.com/>) has emerged as a powerful cloud-computing analysis and visualization platform. This project integrates GEE across multiple geospatial technology courses in the UNI Geography Department to expand student's skills.

Courses Integrated
Fall 2019 - Web Mapping and GIS and Remote Sensing of the Environment
Spring 2020 - GIS II
Planned Fall 2020 - GIS Programming

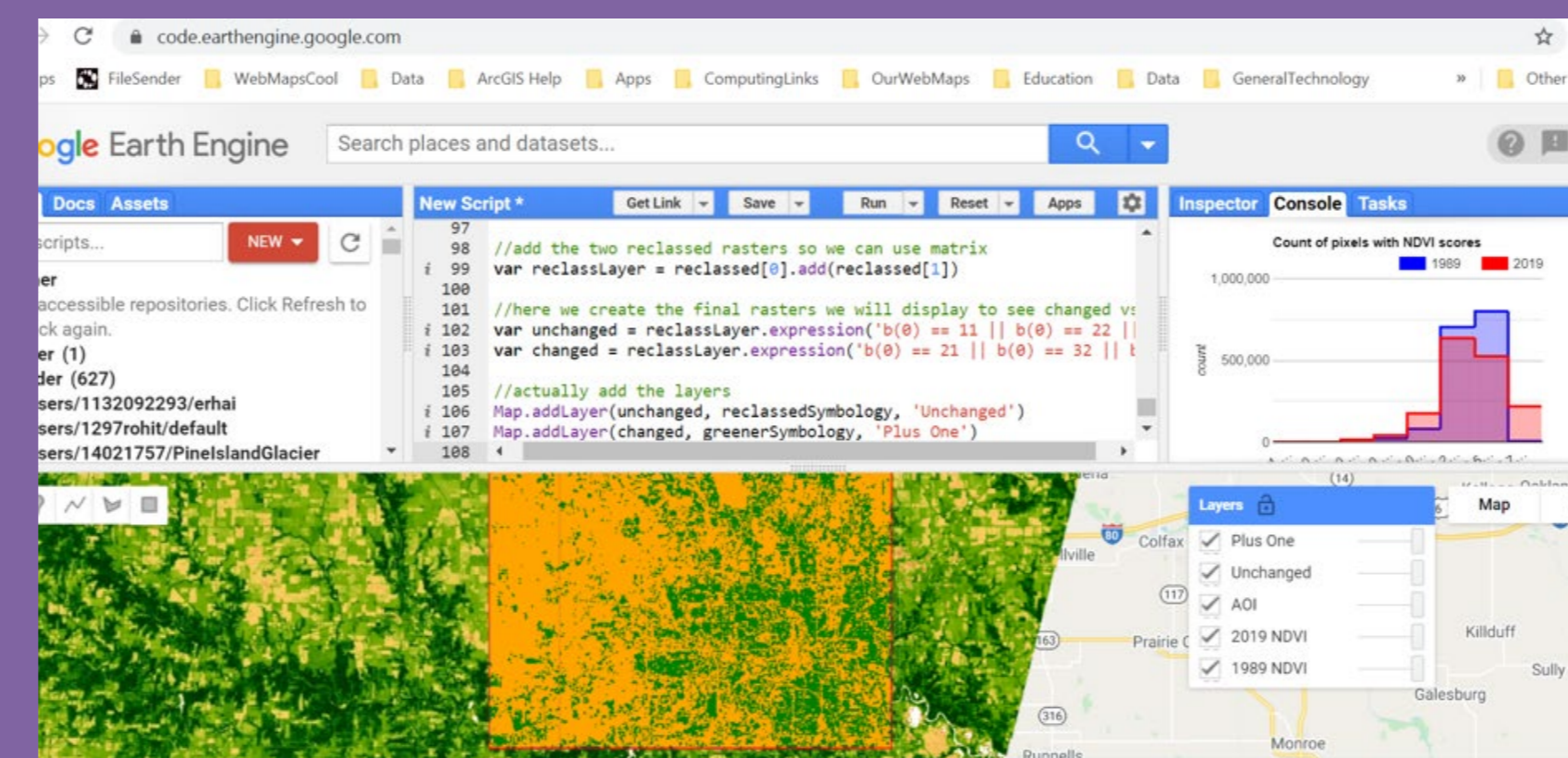
Specific Integration

In Web Mapping and GIS, students analyzed and visualized time series of climatic raster data (PRISM) for state of Iowa and Cedar River Watershed. They then independently chose another geographic area, time period, and climatic variable to investigate. In Remote Sensing of the Environment students carried out change detection using Landsat data from two different time periods in the Des Moines, IA metropolitan area. In GIS II course, the students are using Inverse Distance Weighting interpolation and comparing to results from ArcGIS Online Geostatistical Analysis tool.



Above: GEE and Oregon State University PRISM climatic data were useful for analyzing and visualizing precipitation data over the last 10 years in Iowa demonstrating that there have been extreme dry and wet years.

Below: Landsat data was accessed to carry out a change detection analysis.



RESULTS

The integration of Google Earth Engine has been practically successful as students learned about cloud computing and successfully applied GEE not only as part of prescribed labs but also in some independent projects. Although somewhat anecdotal, pre- and post-surveys of student's knowledge of cloud-computing and GEE specifically increased after lectures covering and labs integrating GEE were introduced. Numerous students in Web Mapping and GIS utilized GEE for their independent project and one Masters student and TA leveraged GEE as part of his Physical Geography lab examining glacial retreat. Another student is applying GEE in his independent study course examining Russian reindeer populations in spring 2020. Finally the model employed to complete this work was successful. Upper level undergrad student worked with faculty to research and develop workflows while the expertise of a programmer was utilized to streamline and complete complex coding.

•Acknowledgements and contact:

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- If interested in code or questions contact: john.Degroot@uni.edu