



Massive Open Online Climate Change Course

Aparna Bamzai, Renee A. McPherson*, and Elinor Martin

University of Oklahoma, Norman, Oklahoma, USA

*renee@ou.edu



1. Overview

We designed a **web-based, interactive course** to provide an integrative understanding of the components of the climate system, **external drivers of climate change**, **impacts of a changing climate** on human and physical systems, and **adaptation and mitigation policy options**. The course was **offered during Fall 2016, freely available for anyone worldwide**. It also was offered as a three-credit, upper division undergraduate course at the University of Oklahoma (OU).

2. Motivation

Working at the Department of the Interior's South Central Climate Science Center, we hear from **natural and cultural resource managers** that they **have not received formal training on climate science**, climate modeling and projections, and **the impacts of climate change** on local and regional landscapes.

It also is **difficult for managers to find high-quality instruction** from a reputable climate science program to attend **given their current time and travel constraints**. One way to serve this community is to **provide an asynchronous learning environment using accessible, internet-based technology**.

In addition, the University of Oklahoma was looking for opportunities to offer more interactive courses on their new web-based platform at

<http://janux.ou.edu/>

3. Course Structure & Online Materials

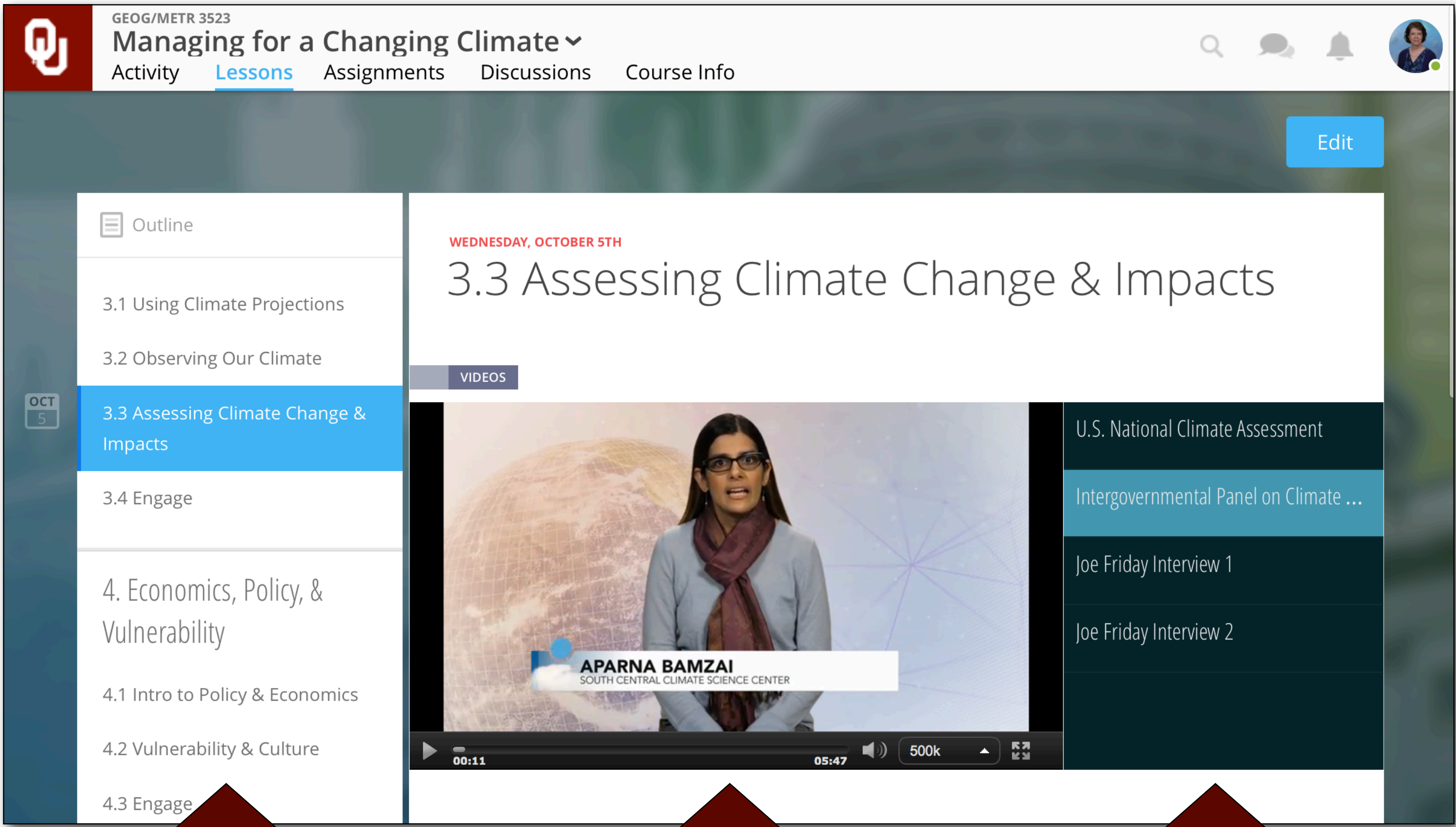
We used OU's Janux platform to deliver instruction on climate change, climate modeling and downscaling, impacts of climate change, and policy examples to novice learners at OU (for 3-hour credit) and sophisticated learners in decision-making positions worldwide.

Learning materials were divided into modules (see figure to right), such as "Economics, Policy, & Vulnerability". Each module contained:

1. **sub-modules that focused on one topic;**
2. **one or more short, highly produced videos in each sub-module; and**
3. **readings, discussions, quizzes, and other activities to engage online learners.**

Both instructor-created and community-created content is searchable, enabling participants to add to the available course material. Also, interactions are seamlessly integrated into all types of educational content: text, videos, images, presentations, and assessments.

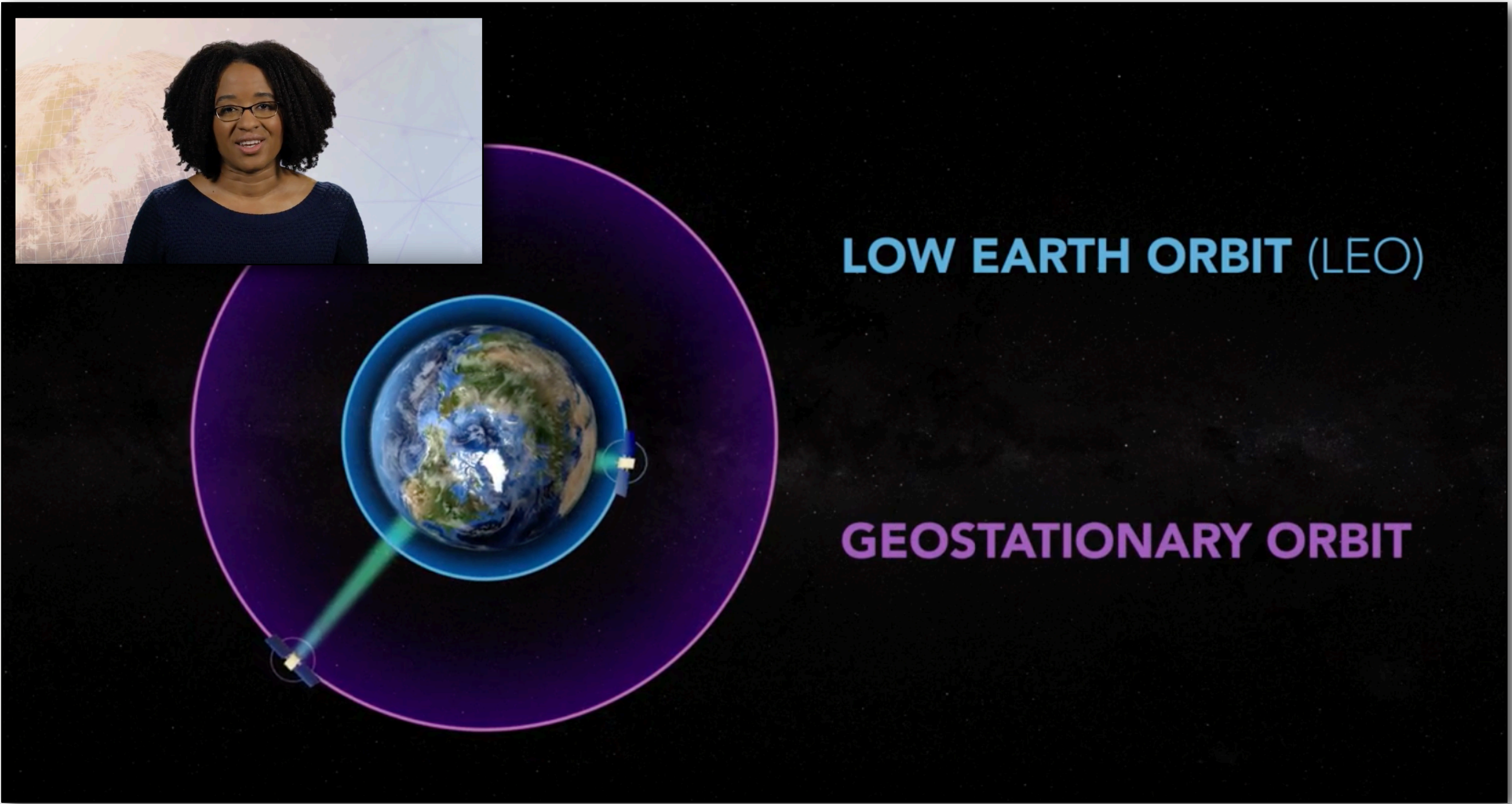
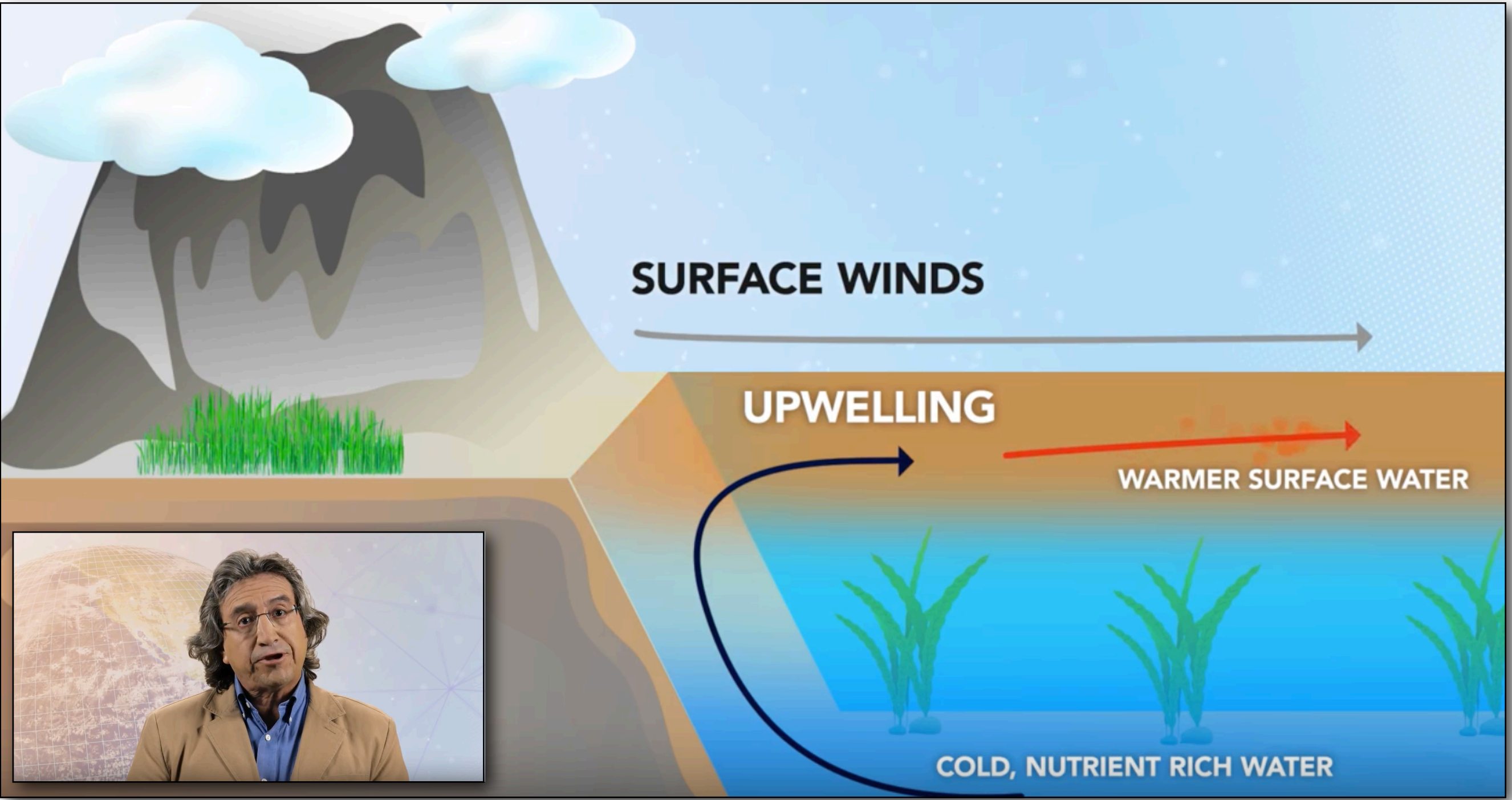
Team-led, professional video production began in a studio with a green screen, makeup, multiple cameras and light sources, and high-end audio/video production software. The scientists wrote their own scripts, then read their edited scripts from a teleprompter, with each 3 to 10-min video requiring 30 to 60 minutes to complete. From there, the raw videos were sent to post-production where they were edited and blended with appropriate graphics, images, and sound. The final videos are available through the now-archived Janux course as well as the YouTube channel of the South Central Climate Science Center.



Modules & Activities for Engagement

3- to 10-minute Video

Videos in the Module



4. Key Principles

Video Modules Teach & Inspire

- Videos provided much of the material traditionally included in a lecture.
- The length of the videos (3-10 min) was too short to cover material thoroughly; readings, quizzes, and, for enrolled OU students, face-to-face discussion and hands-on activities were needed.

Increasing Accessibility to Education

- While only ~30 students took the face-to-face course, almost 600 were able to engage online.
- Many online learners were non-traditional students with full-time jobs, or international participants without access to high-quality, local climate education.

Role Models from Diverse Communities

- In the 46 videos, there were 28 experts, with 17 females, 3 Hispanics, 3 African Americans, 3 Native Americans, and 1 Asian, ranging in age from 20s to 70s.
- It was important to demonstrate that work on climate change and its impacts needs a diverse body of experts and collaborators.

Linking Learning to the Real World

- Science was delivered in a context that prepared students for the workforce: building oral and written communication skills, discussing and negotiating complex problems, and constructing defensible arguments for various solutions.
- Learners were introduced to problems in other countries that challenged their preconceived notions.

Acknowledgements

Development of this course was funded by the USGS through the South Central Climate Science Center on Grant #G15AP00136, NASA through the Oklahoma Space Grant Consortium on Grant #NNX11AB54H, and the OU College of Atmospheric and Geographic Sciences. NextThought LLC produced the video modules and web site, and OU's Center for Teaching Excellence guided the curriculum design. We appreciate the talented experts who contributed to the videos. Special thanks to Janelle Barrick, Chris Kalinski, Meleah Meadows, Jeff Muehring, and Zach Strauss of NextThought LLC.