

ISEI Visitors Need Support to Understand Current Scientific Research Presented in Data Visualizations on 3-D Global Projection Systems

Kathryn Stofer – Oregon State University // stoferk@onid.orst.edu

Céleste Frazier Barthel – Oregon State University and Wilson College // cbarthel@wilson.edu

Shawn Rowe – Oregon State University and Oregon Sea Grant // shawn.rowe@oregonstate.edu



Little is known about how informal science education institution (ISEI) visitors make meaning from these images.

These platforms were introduced to museums around 2004. Since then, few research studies but some evaluations have been done. Visitors are attracted to these exhibits but don't stay long unless there is a docent-led presentation or an interactive kiosk to provide explanations about the images. At globes with strictly auto-run presentations, dwell time has a median of less than a minute, while docent-led presentations have a dwell time of nearly 18 minutes. Kiosk-driven globes have a median dwell time of about 6 minutes.



Photo credit: Flickr – woodleywonderworks

We used a combination of quantitative and qualitative methods to explore interactions in multiple settings.

Quantitative data collection included unobtrusive observations of visitors recording dwell time and counting particular interactions. Qualitative data collection included videotaping and coding interactions, as well as in-depth interviews with visitors with or without stimulated recall. Data was collected at one 6-ft. diameter globe with live or auto-run presentations at a large independent science center on the East Coast, and at one 3-ft. globe with kiosk-driven interactions at a university-operated science center on the West Coast. A variety of images were used.



Photo credit: Rowe, et. al., 2010

Visitors do not automatically recognize that the images and animations are from remote-sensing data.

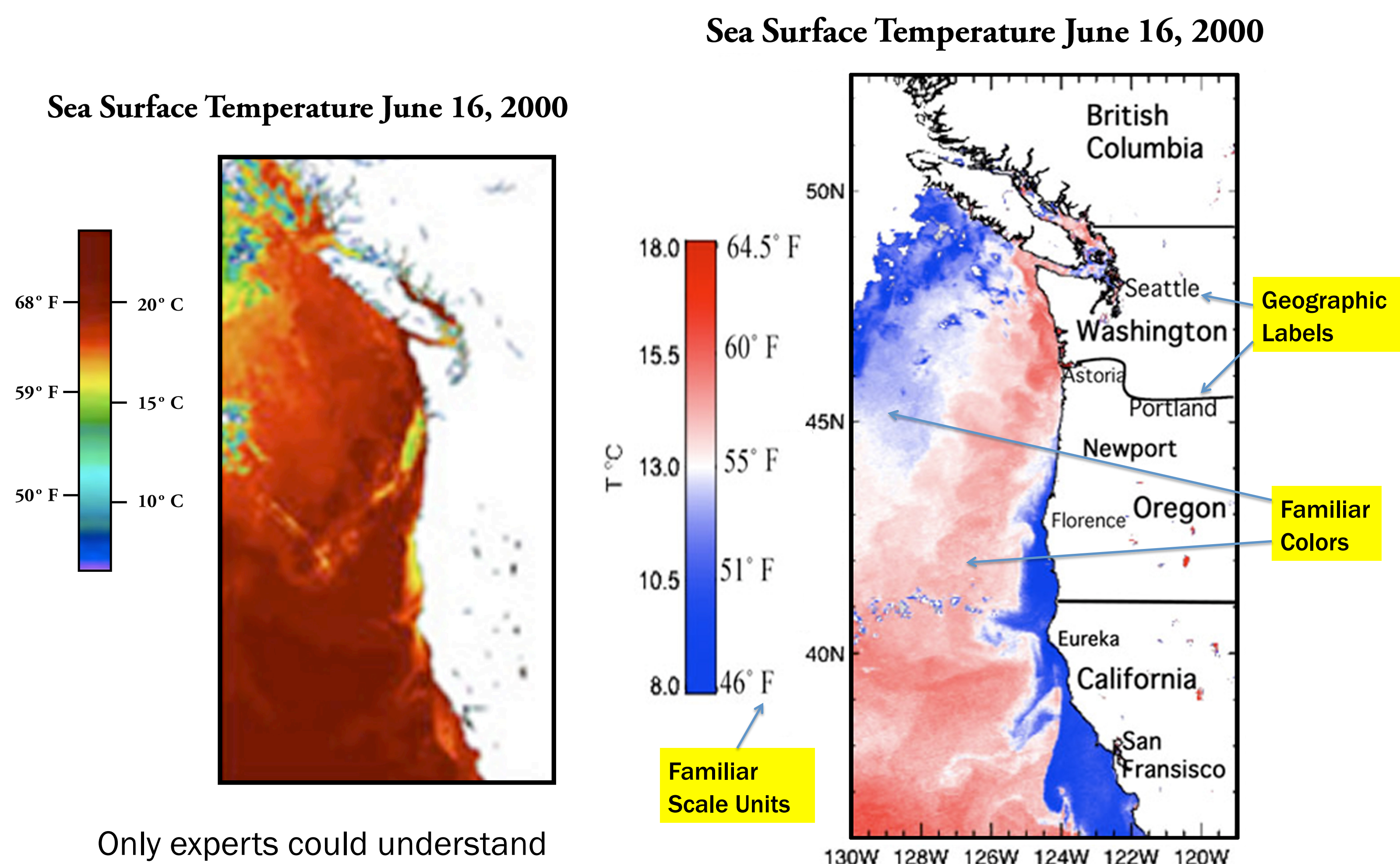
Barthel (2010) found visitors 1) did not recognize the term “remote sensing” until it was explained in the context of something such as GPS, 2) thought the images were pictures of Earth, not visualizations of data, and 3) thought the false colors were produced by camera lenses. Rowe, et. al. (2010) also found confusion as to the sources of the images even with narration and text in an accompanying kiosk.

Visitors use prior knowledge and experiences to try to make meaning as a group.

Constructivism suggests that meaning is made through putting new knowledge in context with prior knowledge. Our results show that visitors talk about prior knowledge and experiences but do so in order to share with their groups, often using deictic words, indefinite words or gestures that need context, to indicate presumed or attempted shared meaning, a more sociocultural approach to learning (Rowe, et. al., 2010, Barthel, 2010).

Novices benefit from familiar color, data scales and labels indicating geography, date and time.

On their own, many scientific images are obscure to visitors (Phipps and Rowe, 2010), and many content questions and statements in visitor groups revolve around clarifying what the images are depicting (Rowe, et. al., 2010, Barthel, 2010). Visitors are confused when the same color schemes are used on several different images to mean different things (Rowe, et. al., 2010; Phipps and Rowe, 2010; Barthel, 2010). Date and time are not easily transmitted via accompanying text (Rowe, et. al., 2010).



Only experts could understand this “scientific” image.

Both experts and novices recognize this depicts ocean temperatures in the northeastern Pacific.

Visualizations cannot be simply re-purposed as-is from scientific publications for the public to make meaning from them.

Visualizations of global Earth system science data must use significant scaffolding for educational use. With support, visitors can be helped to understand the scientific data represented. When visualizations are more readily understandable, docents and/or kiosks can serve to highlight features relevant to problems and thus support visitors in making judgments related to policy or lifestyle decisions as science literate citizens.