Exploring Sea Level Rise: A guided tour through our changing Earth

“Sea Level Polar Explorer App”

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What is Polar Explorer?

• Developed through the NSF PoLAR CCEP grant a guided tour through the many layers of science that impact climate and ultimately sea level rise. We did not create the data – we pulled it together to provide a scaffolded exploration.

• An app was the selected medium based our Earth Observer app & pedagogically on work by Segal (2011) which found interactively working with visual media can enhance learning and motivation for processing & understanding complex systems.

• A series of questions frames this map-based data-rich app that move the user through map layers with whatever level of complexity they chose to explore.
• Do you ‘Believe’ in Climate Change? Climate change is not a ‘belief’ – we have evidence of a changing climate in the many systems that are all part of a rise in sea level. This app demonstrates this through the actual data.

• “I read it in an article”. Users of the app learn directly from the data with no one interpreting the information. Independent learning provides insights that cements the understanding.

• The data sources are reputable science agencies. The data behind the maps in the app are from NOAA, NASA, USGS and other science partners and are referenced for users.
Addresses Misconceptions

- **A few degrees**: Addresses the myth that few degrees of temperature change will not make a difference. Time traveling with the app shows how ocean temperature in the last glacial and last interglacial were only a few degrees from today’s.
- **This climate change is normal**: The app shows that prior changes in climate occurred over thousands to millions of years, not at the accelerated rate we are seeing today.
- **Humans are not part of the problem**: Sections in the app address the role of humans in altering the balance and reducing the resilience of the Earth.
- **Humans will adapt**: The who’s vulnerable section points out areas where people will be adversely affected and unable to adapt.
Supports for the user:

- **Question driven** structure to guide the user
- **Short Introduction** to the topic in the map
- **1 minute audio** for a bit more on the topic
- Each topic has the data **source posted** & and **information link** to a longer write up, links to more info
- **Slider** allows the user to **remove the map** for orientation
Main Question Categories include:

- What is sea level?
- Why does sea level change?
- Where is sea level changing now?
- What is happening at the polar regions?
- What about sea level in the past?
- What are future predictions US Coast?
- Who is vulnerable?
Begin with ‘What is Sea Level’ definitions and some background that adds context.
Each map is interactive so the user can collect

Inserting some linkages to systems to encourage ‘Systems Thinking’ i.e. the link between ice sheets and ocean sea level. This section also encourages spatial thinking since the audio encourages them to explore deep and shallow places in the ocean bottom.
Dive down into the ocean to see which layers are changing the most.
Where is sea level changing now?

Worked with NOAA to link in their data and it is touch interactive for exploration.
What about climate in the past?

Can link deglaciation and isostatic rebound with ‘Where is sea level changing now?’
Show ice sheet extent.
What about climate in the past?

Can link deglaciation and isostatic rebound with ‘Where is sea level changing now?’ Showing ice sheet thickness.
What about climate in the past?

We can step through ice sheet retreat.
What about climate in the past?

We can look at ice sheet retreat and the data used to determine this.
What about the polar regions?

We can look at polar ice sheets to see their potential to affect sea level.
Who is vulnerable?

Communities and regions at risk from rising sea level – ocean atolls
Human Footprint affects the landscape which impacts our resiliency in the face of physical events that would be increased by a rise in sea level.

Who is vulnerable?
Who is vulnerable?

Humans facing increased risk from the natural system as a result of Sea Level Rise.
Currently Level “Polar Explorer App” is at the app store being reviewed. In the interim we are set up for beta testers...

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