Global Warming Effects (GWE) on the Operations of Human Infrastructure

by John M. Dilorio

November 13, 2013

Lunch and Learn
Lockheed-Martin Lunch Room

- This lunch and learn session will focus on various types of damage on the operations supporting human infrastructure. Bridges, windows, city landscaping, communications and food sources will be discussed using lecture notes, videos, and photographs.
- The information contained in this lunch and learn session has been cleared by NASA.

Bridges (Tacoma Narrows, I-280 suspension, I-35 fixed)

- **Tacoma Narrows - Tacoma, WA 1940 - Destroyed by dynamic wind energy or VKEPT (Vortices kinetic energy power transfer)**
  - **Problem solution set: (Prize)** *http://youtu.be/XggxeuFDaDU*
- **I-280 suspension – Davenport, IA 1977 - Oscillated the cable suspension by dynamic wind ice storm (VKEPT) for 45 minutes**
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    1. **Environmental conditions (GWE on design)**
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- Solutions:
  1. Redesign gusset-thicker
  2. Recalculate stress-strain limit for additional pavement
  3. Post sign – No heavy equipment on bridge

I-280 suspension – Davenport, IA

Windows (Hurricane Ike, Highrises, and Skyscrapers)

- Hurricane Ike was a 2008 Category 2/4 and a GWE storm. A GWE storm is defined as:
  1. Tsunami by hurricane (earthquake, volcano, asteroid, plate buckle)
  2. Super intensifying (water and land heat islands)
  3. Multiple wind patterns (overlapping straight line winds)
  4. Intense destruction including flooding
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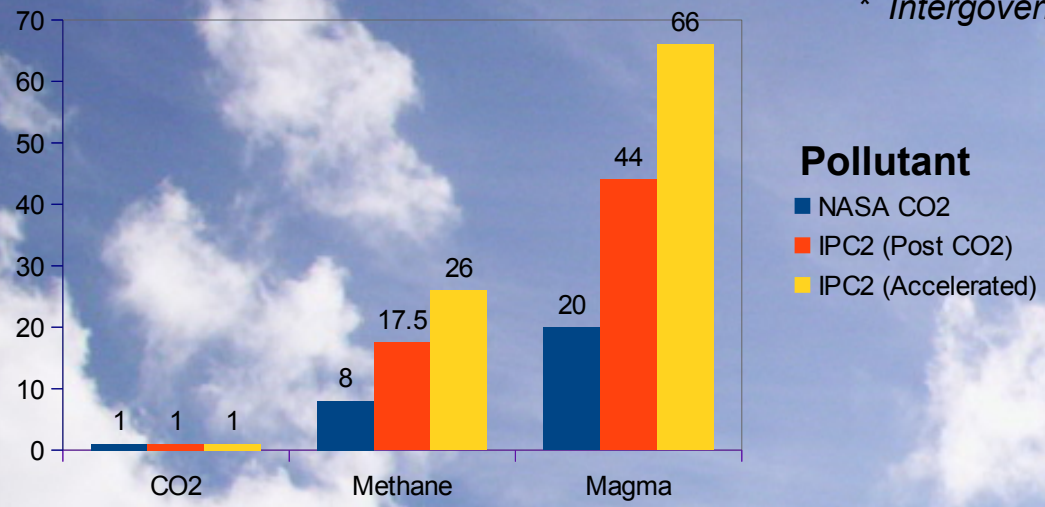
- **2005 – 4 GWE storms: Katrina, Ophelia, Rita, Wilma**
- **Galveston highrise apartments, 22 stories, level 3 certified windows**
  - **Problem solution set:** *http://youtu.be/KZt5DjMg3Yc*
- **Houston downtown skyscraper, 76 stories, level 2 certified windows**
  - **Problem solution set:** *http://youtu.be/3YyGmYszXZ8*
- **Other hurricane Ike issues.**
  Problem solution set: *http://youtu.be/9lWEsH62ygQ*
  1. **Dial 311 (heavy trash - trees)**
  2. **Electrical power loss**
  3. **Phone connection disruption**

Accepted GWE Standards (NASA and U.N. IPC2*)

* *Intergovernmental Panel on Climate Change*



- **Note: Under the NASA standard, 1 metric ton of Methane (gas) released into the atmosphere or absorbed by the oceans equals the global warming effect of 8 metric tons of CO2 (GWE pollutant).**

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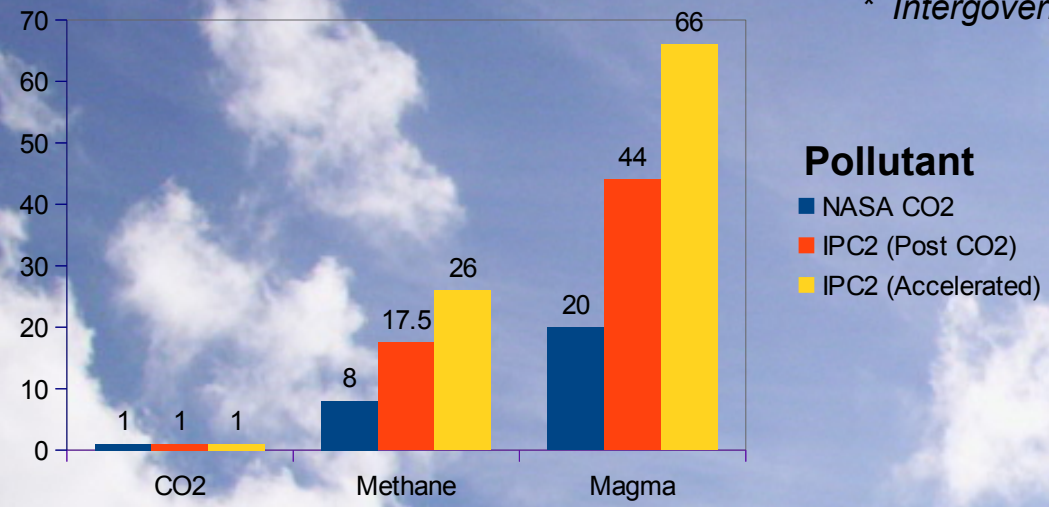

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  - **#1 Threat – Life in the sea (33% human food source) [Chart]**
  - **#2 Threat – Agriculture farming (30% human food source) [Chart]**
  - **#3 Threat – Domesticated animals (25% human food source)**
  - **#4 Threat – Wild plants, animals, birds, and fresh water fishes (12%)**
- **Note: There are other threats like rising sea level, destructive weather patterns, wild fires, droughts, even a rise in human violence, but these are not the main threats.**
- **Note: In the United States and Europe, 20% and 40% of our food sources comes from the sea and agriculture farming, respectively.**

#1 Threat: Life in the Sea IPC2 Post CO_2

- Life in the sea is important because:
  1. It's the largest and fastest renewing source in the human food chain
  2. It acts as a balancing tool for a number of reasons
  3. It creates plankton, habitats, and is food for land animals/birds
- Global warming creates 'dead zones' (GOM-Gulf of Mexico)
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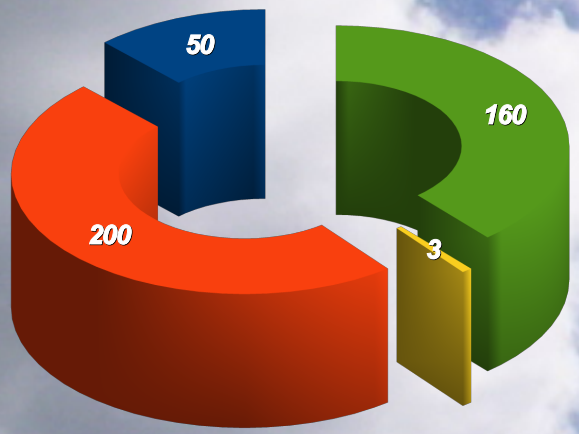
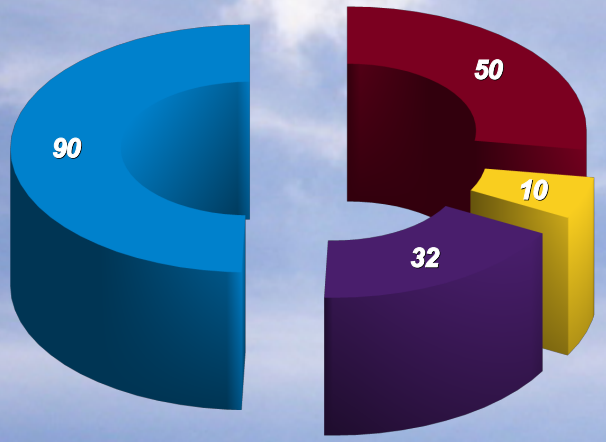
Two Major Studies

NSA (2008 Chart)



- Pollutant Ansorption Rate %
- Factor Analyzed (correction type)
- Main Factor: Pareto Analysis
- Years of Study Basis since 1850
- Conclusion: Sea Life is Dying
- End Time Cut-off: 2020, 2025, or 2036

NASA (2009 Report)

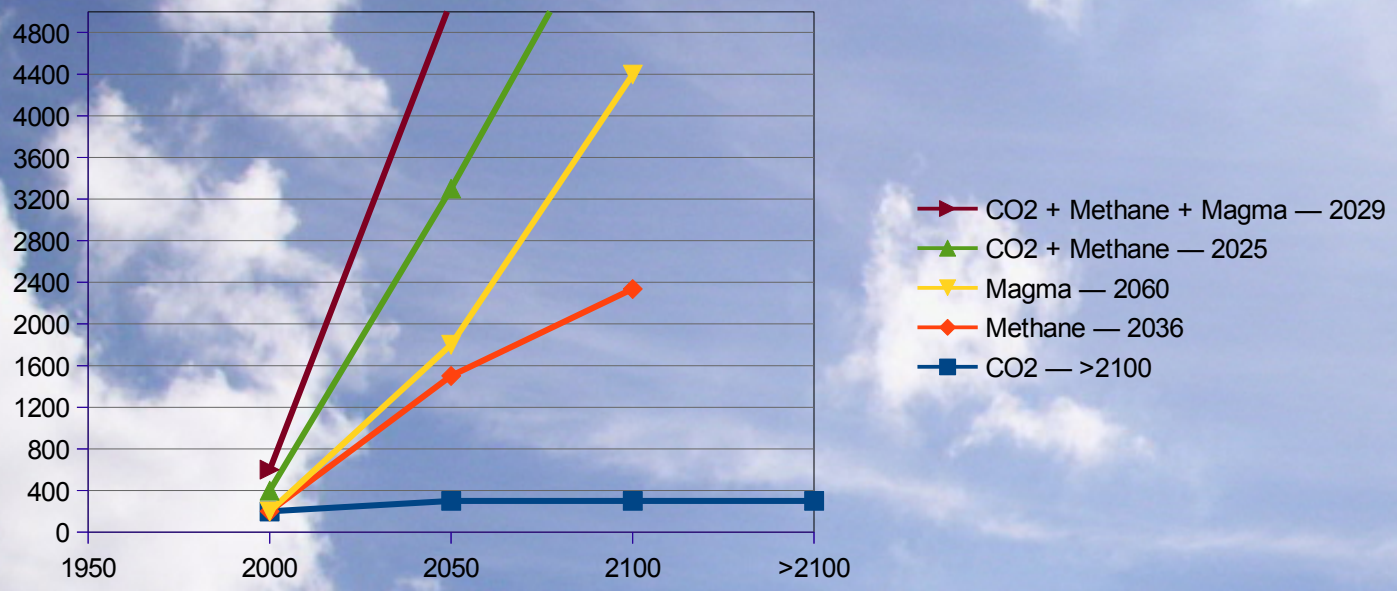


- Pollutant Ansorption Rate %
- Factor Analyzed (indicator type)
- Main Factor: out of 32 indicators
- Years of Study Basis since 1960
- Conclusion: Sea is Warming
- End Time Cut-off: none given

NSA reference: "Open Fuel Standards (OFS) Act with amendments" letter, 10/28/10
NOAA/NASA reference: 'State of the climate in 2009'

- **This chart represents a consensus and means that humankind understands the problem!**

#1 Threat: Life in the Sea (continued)



Problem solution set:
(Metric) 800 billion tons of pollutant absorbed Solutions:

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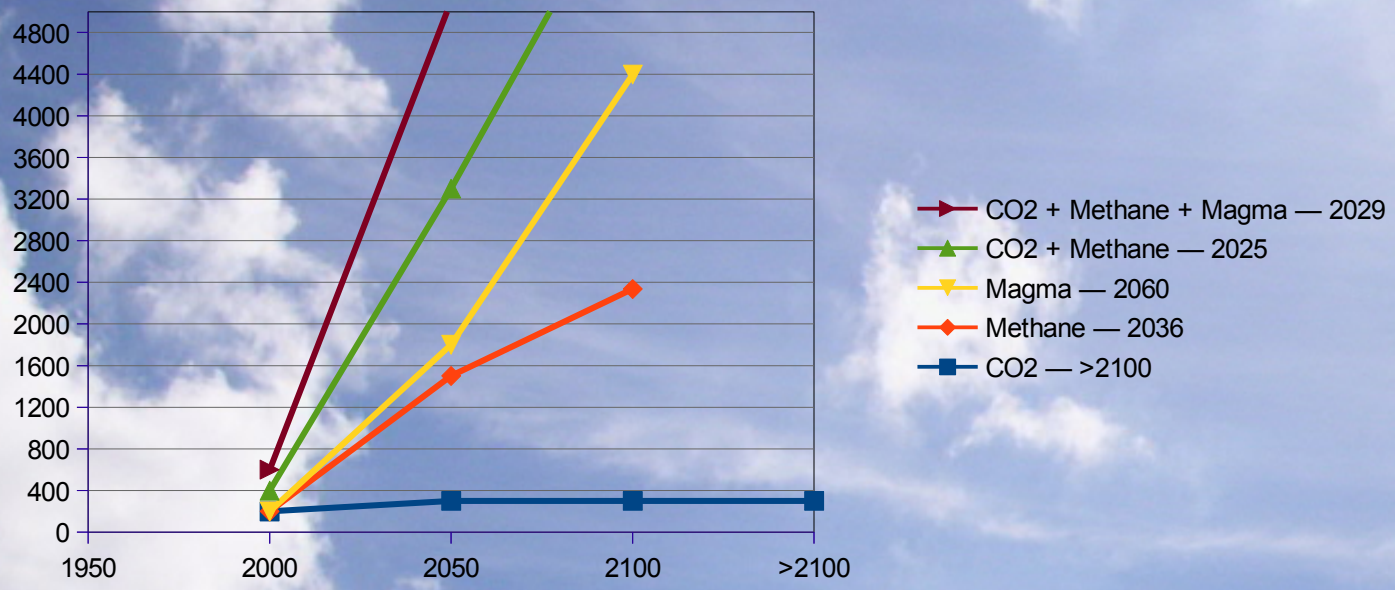


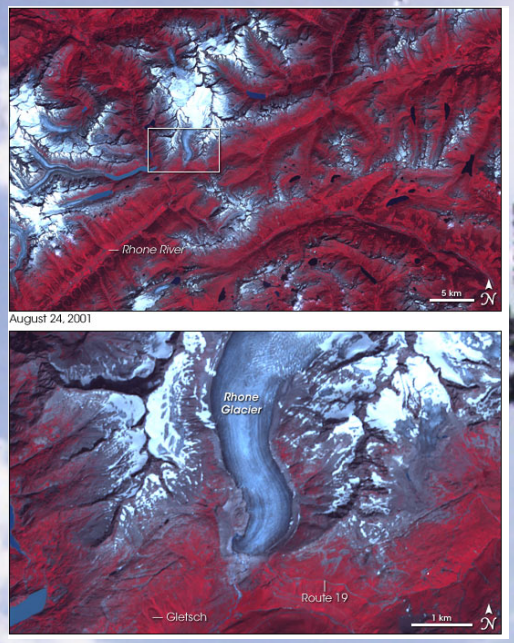
Problem solution set:
(Metric) 800 billion tons of pollutant absorbed Solutions:

1. **Methane extracted from the sea convert into transportation gas M15**
2. **Institute M & M practice; Moratorium and million (CO_2 and Methane)**
3. **Get serious on technology with 'design for longevity'**

#2 Threat: Agriculture Farming- IPC2 Accelerated CO_2

- In order to understand and analyze the threat, we must first understand our water storage methods by continent (category):
  1. Caribbean Sea countries: High water table without lake/river support.
  2. North American countries: Low water table with lake/river support.
  3. European countries: Glacier fed rivers and lakes.

- Note: Every type of water storage is under some stressor of global warming, also issues of overuse, mismanagement, and non-management.



NASA images created by Jesse Allen, Earth Observatory, using data provided courtesy of the NASA/GSFC/MITI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team

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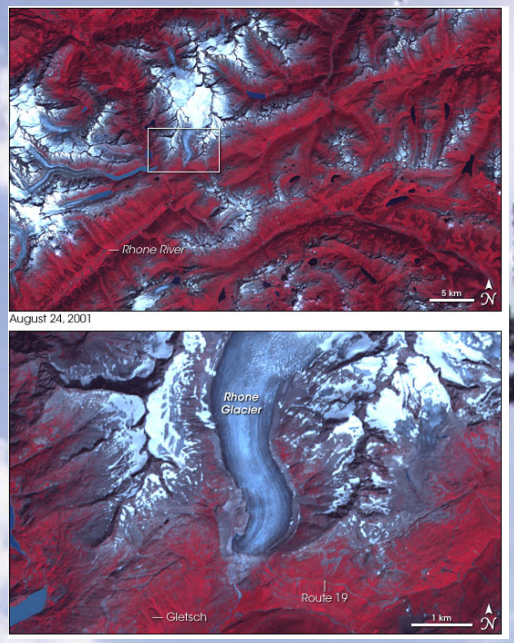

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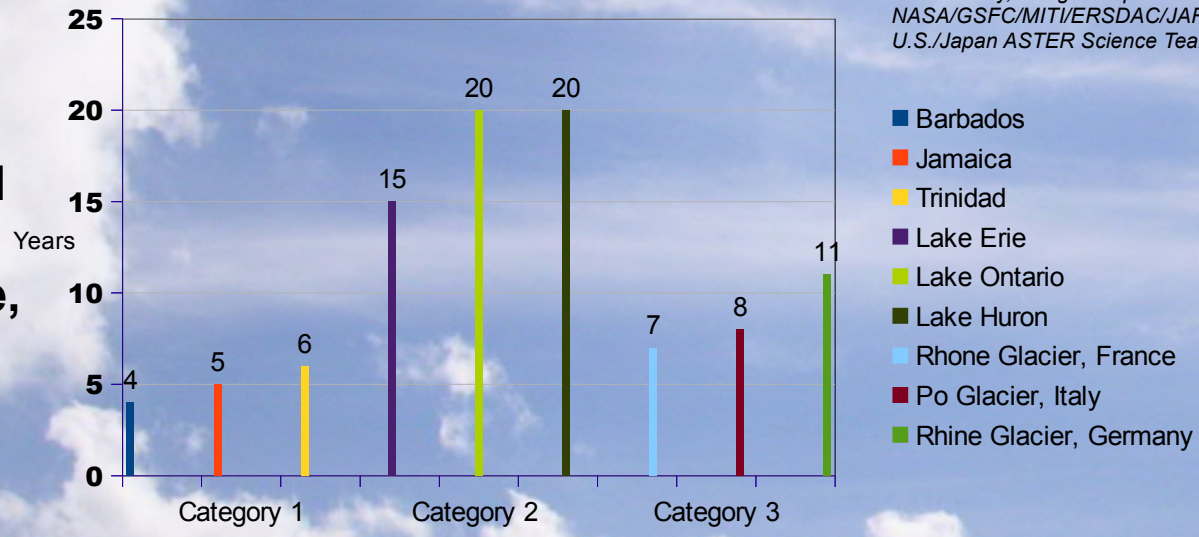

#2 Threat: Agriculture Farming-(continued)

- References: Cat 1; Caribbean Water and Wastewater Association
- Cat 2; Department of Agriculture (DOA) and NASA (60 yrs of mapping)
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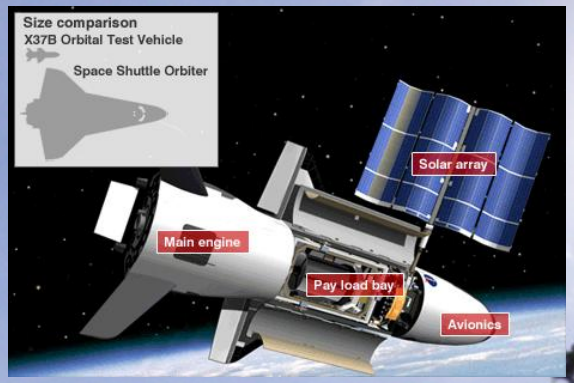

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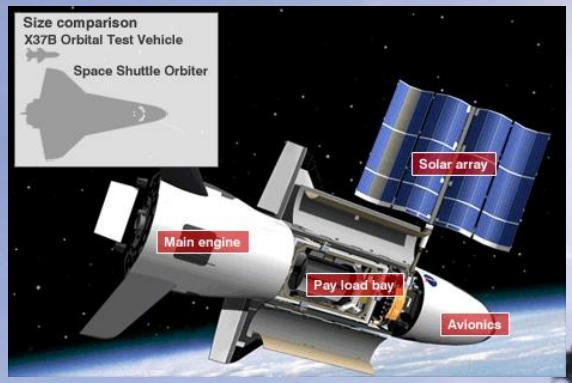

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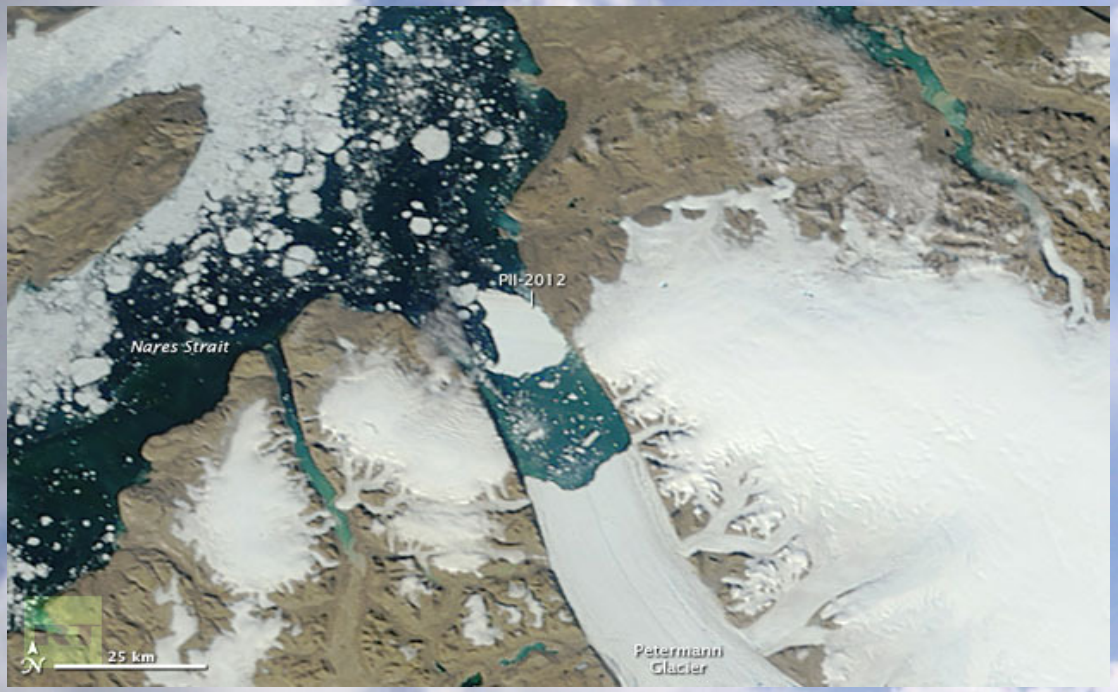
- Problem solution set: Solutions:
  1. Implement water conservation methods with total management
  2. Use farming methods with less water per metric ton produced
  3. Create alternate source of fresh water by using icebergs



Anakrakatoa (2012)

Main Indicators:

- **Measured height-1006 feet, growing 211 feet per year (Krakatoa was 2667 feet high) In eight years (2020), the volcano will be (1006 + 1688) 2694 feet high.**
- **Tremor readings (estimated 600 – 1500 million tons TNT for a single dome-Krakatoa had three domes rated at 200 million tons TNT)**
- **Magma smoke (singular explosion as a single dome)**
- **Sea foam (magma collusion with sea water)**

Summary:
What to take home with you?

- Understand every problem has a solution
- Understand that humankind has a responsibility and accountability to maintain our life-zone
- Understand that a small effort by millions impacts and slows down both sides of the global warming equation

If you want a copy of this session, refer to the program chair or website.