

# Making The Invisible Visible: How an artist can translate/transform scientific data into a comprehensible visual language

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November 21, 2022

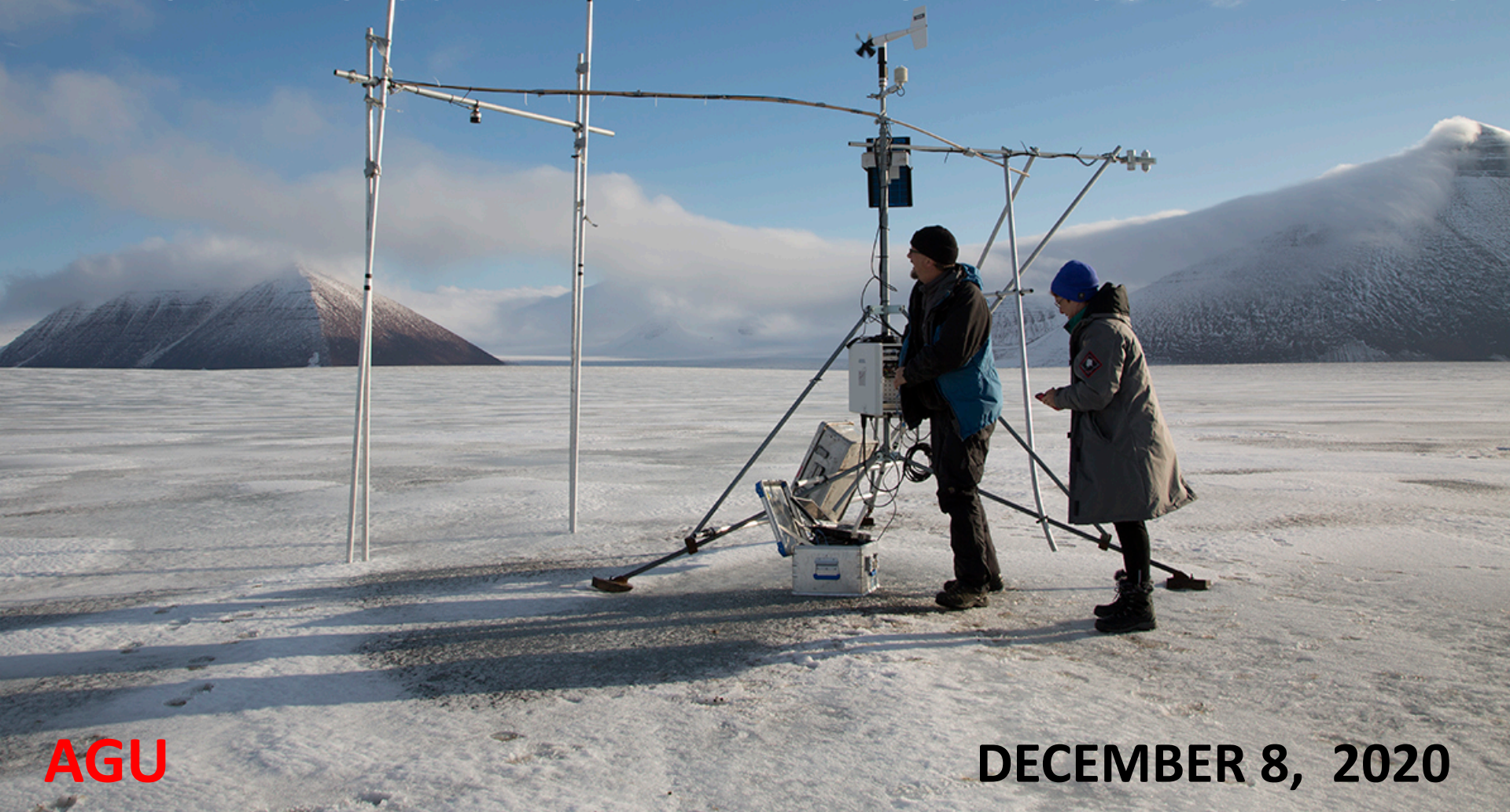
## Abstract

While Artistic techniques may help scientists visualize data and communicate results to their colleagues, I believe the Arts can play a more significant role in communicating scientific information to the general public. Modes of presentation of information determine the impact of reception. Data on a page or screen is received cerebrally. Psychologists posit that concepts received emotionally can have a more lasting, deeper impact on an audience. That is what the arts (film, dance, drama, painting) can achieve. My paper will demonstrate through a particular project that concept. It will involve the presentation of a recent 56 foot long piece I've completed called "THE WORLD MAP SERIES" : <https://www.dianeburko.com/new-page-1m> which speaks to the impact of Climate Change on glaciers and coral reefs. This 10-part series represents my bearing witness to melting ice and coral bleaching, as well as exchanges with glaciologists and marine biologists over the past few years. It will also serve as an example of the artistic process.

**DIANE BURKO**

**MAKING THE INVISIBLE VISIBLE**

**TRANSLATING SCIENTIFIC DATA INTO MY VISUAL LANGUAGE**



**AGU**

**DECEMBER 8, 2020**



## ARTIST



1980, On Cliffs of Etretat –  
Giverny Residency Center Residency

## IN THE LANDSCAPE



1993, at Casa Rosa Studio on Lake Lecco  
Rockefeller Study and Conference



**IT BEGAN WITH THE “LANDSCAPE”**

**GIVERNY, RESIDENCY, MONET'S GARDEN,**





FIRST FLIGHT WITH JIM TURRELL    1977    48 x 80 inches





VOLCAN POAS #4a + 4b

1998

84 x 120 inches





PALAMI PALI #5

2001

60 x 96 inches





GODAFOSS #6    2004    60 x 96 inches



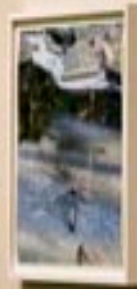
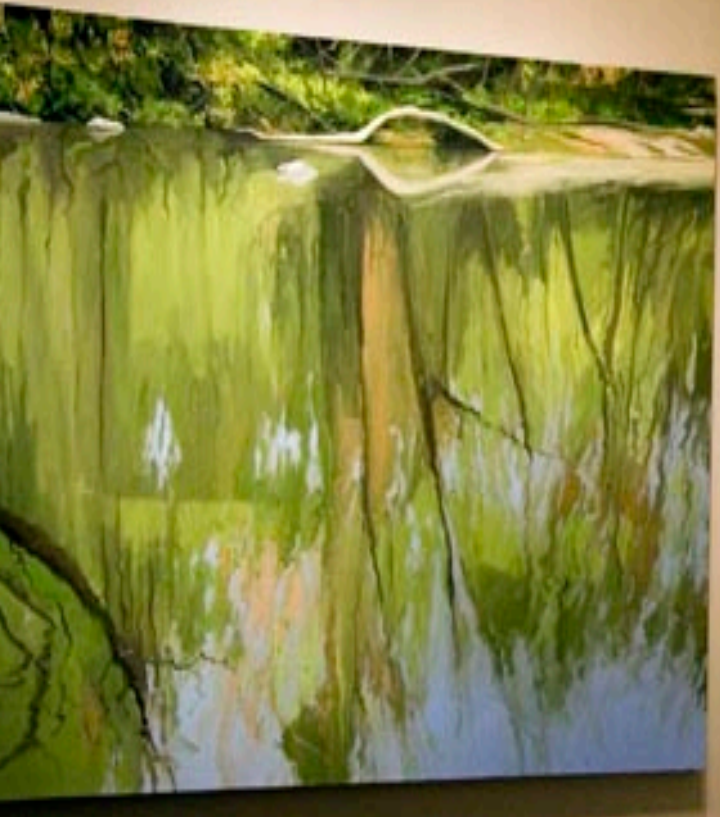


SPERRY 1    2011    40 x 60 inches



from

# LANDSCAPE to the ENVIRONMENT: CLIMATE CHANGE



Installation *FLOW*,

MICHENER MUSEUM

2006





GRAND JORASSES – POINTE MARGUERITE 1976 64 x 108 inches



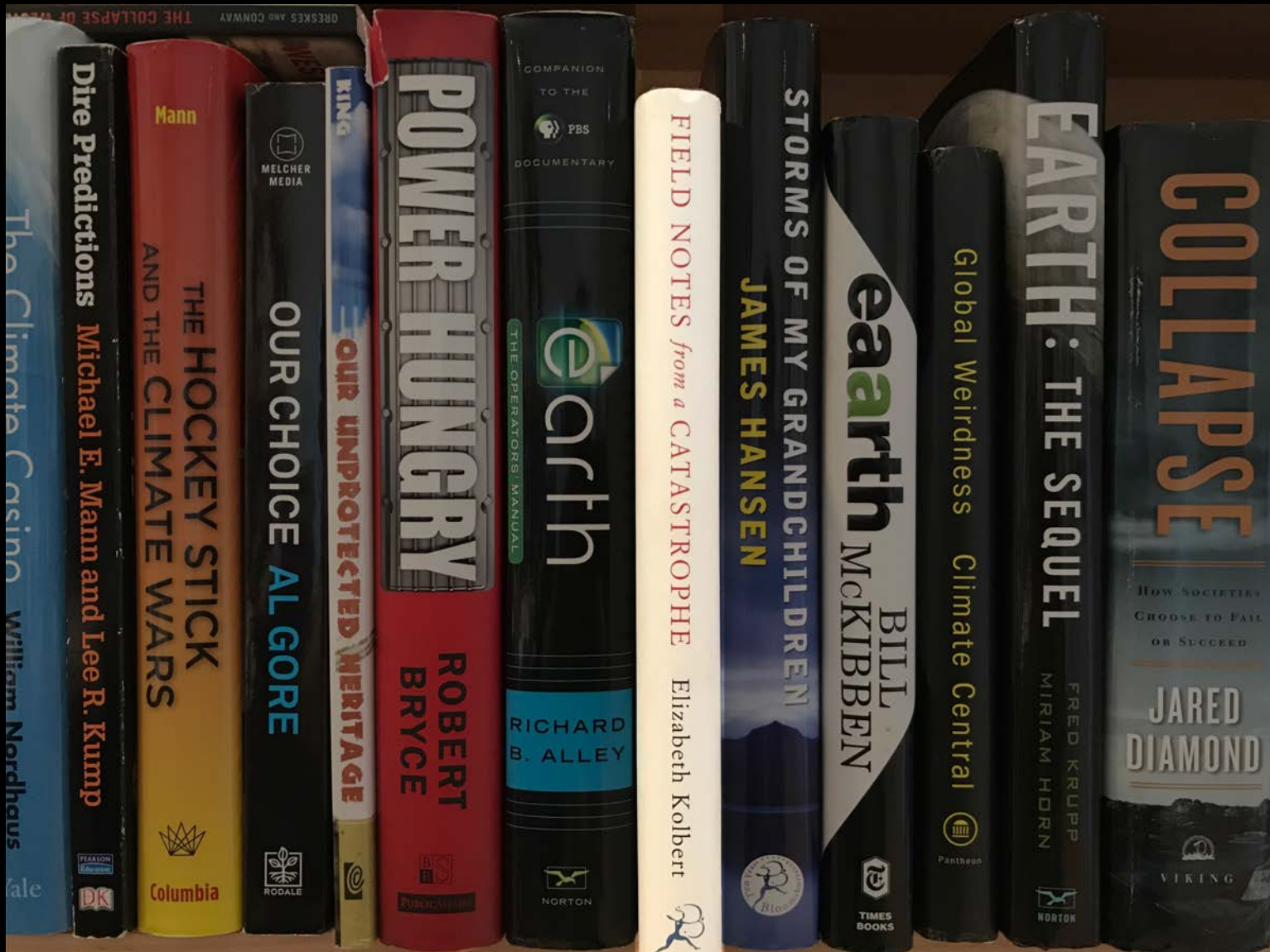
# an inconvenient truth

the crisis of  
global warming



AN INCONVENIENT TRUTH comes out in 2006







**ELIZABETH KOLBERT: Field Notes on a Catastrophe**




# REPEAT PHOTOGRAPHY



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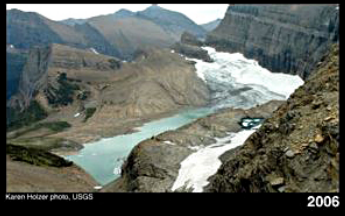
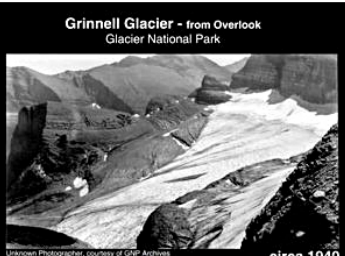
## USGS Repeat Photography Project Documents Retreating Glaciers in Glacier National Park

SHARE

### Global Climate Change Background

Glacier National Park's namesake glaciers have receded rapidly since the Park's establishment in 1910, primarily due to long-term changes in regional and global climate. In the last century, the five warmest years have occurred in the last 8 years - in this order: 2005, 1998, 2002, 2003, 2004 (NASA). These changes include warming, particularly of daily minimum temperatures, and persistent droughts. This warming is ongoing and the loss of the Park's glaciers continues, with the park's glaciers predicted to disappear by 2030.


### Repeat Photography Project Overview



Climate change research in Glacier National Park, Montana entails many methods of documenting the landscape change, including the decline of the park's namesake glaciers. While less quantitative than other high-tech methods of recording glacial mass, depth, and rate of retreat, repeat photography has become a valuable tool for communicating effects of global warming. With evidence of worldwide glacial recession and modeled predictions that all of the park's glaciers will melt by the year 2030, USGS scientists have begun the task of documenting glacial decline through photography. The striking images created by pairing historic images with contemporary photos has given "global warming" a face and made "climate change" a relevant issue to viewers. The images are an effective visual means to help viewers understand that climate change contributes to the dynamic landscape changes so evident in Glacier National Park.

The Repeat Photography Project began in 1997 with a systematic search of the archives at Glacier National Park. We began searching for historic photographs of glaciers in the vast collection that spans over a century. Many high quality photographs exist from the parks' early photographers such as Morton Elrod, T.J. Hileman, Ted Marble, F.E. Matthes, and others who scoured the park to publicize its beauty and earn their livings. Copies of the historic photos were taken in the field to help determine the exact location of the original photograph. Photographing the glaciers cannot occur until the previous winter's snow has melted on the glacial ice and when air quality conditions are considered at least good. This creates a narrow window in the northern clime of Glacier National Park where smoke from forest fires prevented photography on many occasions in the past few years.

Since 1997 over sixty photographs have been repeated of seventeen different glaciers. Thirteen of those glaciers have shown marked recession and some of the more intensely studied glaciers have proved to be just 1/3 of their estimated maximum size that occurred at the end of the Little Ice Age (circa 1850). In fact, only 26 named glaciers presently exist of the 150 glaciers present in 1850.



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GALLERIES

STAFF

View Repeat Photos

**NOTE:** Repeat Photo pages are best viewed on monitors set to at least 1280 pixels wide.

#### Glaciers

- Agassiz (Boulder Pass)
- Agassiz - terminus
- Blackfoot-Jackson
- Boulder
- Boulder - Ice Cave
- Boulder - Chapman Peak

USGS: Glacier National Park Repeat Photography Project





GRINNELL OVERLOOK #1, 1940 (GNP Archives);  
GRINNELL OVERLOOK #2, 2006 (after Karen Holzer)      2009      50 x 162" overall



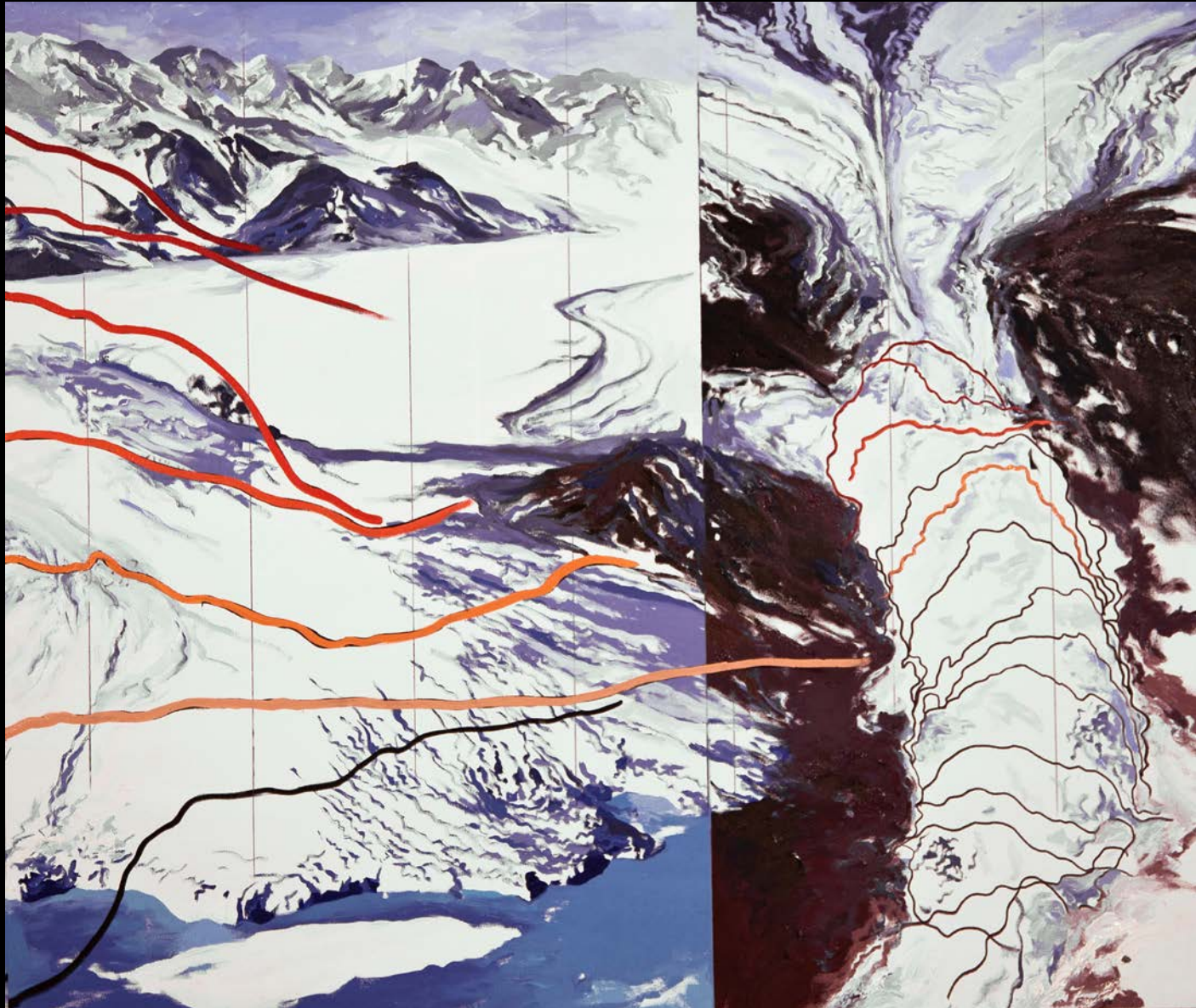


**GRINNELL MT. GOULD #1, #2, #3, #4, 2009,**

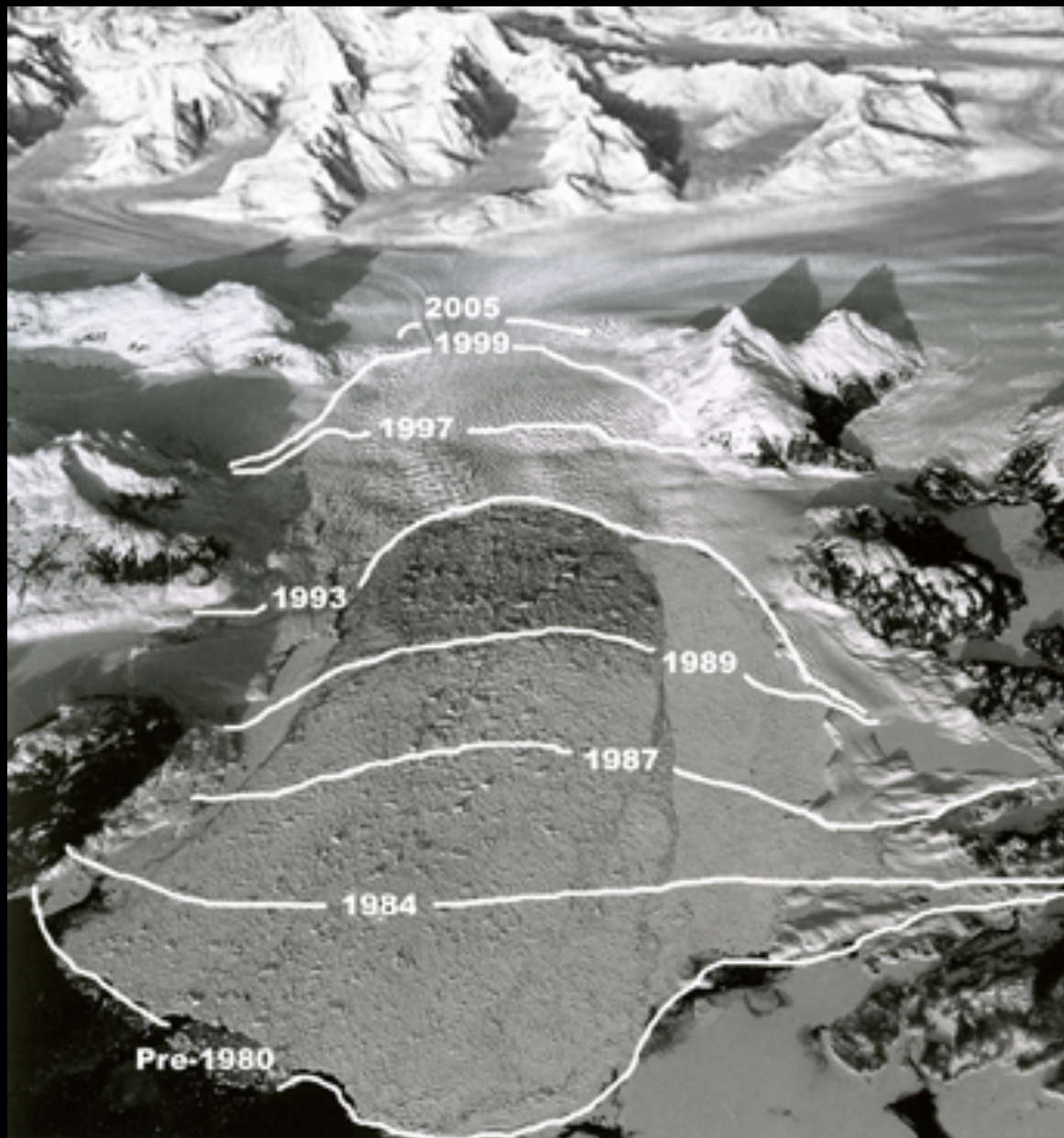
**88"x200"**



# RECESSIONAL LINES



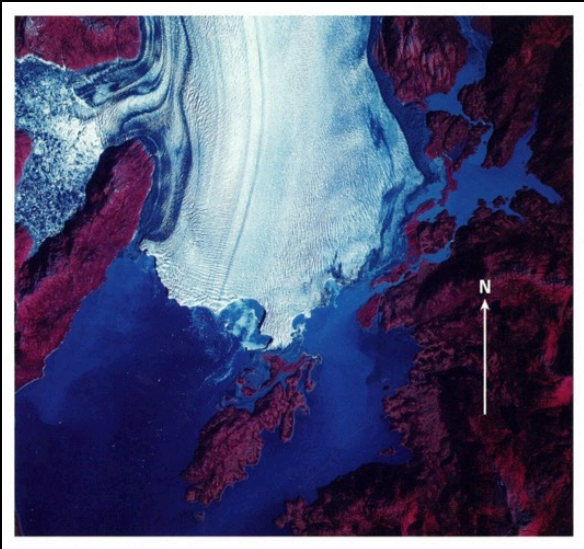




GLACIAL RECESSIONAL MAP combining images from Tad Pfeffer and Austin Post

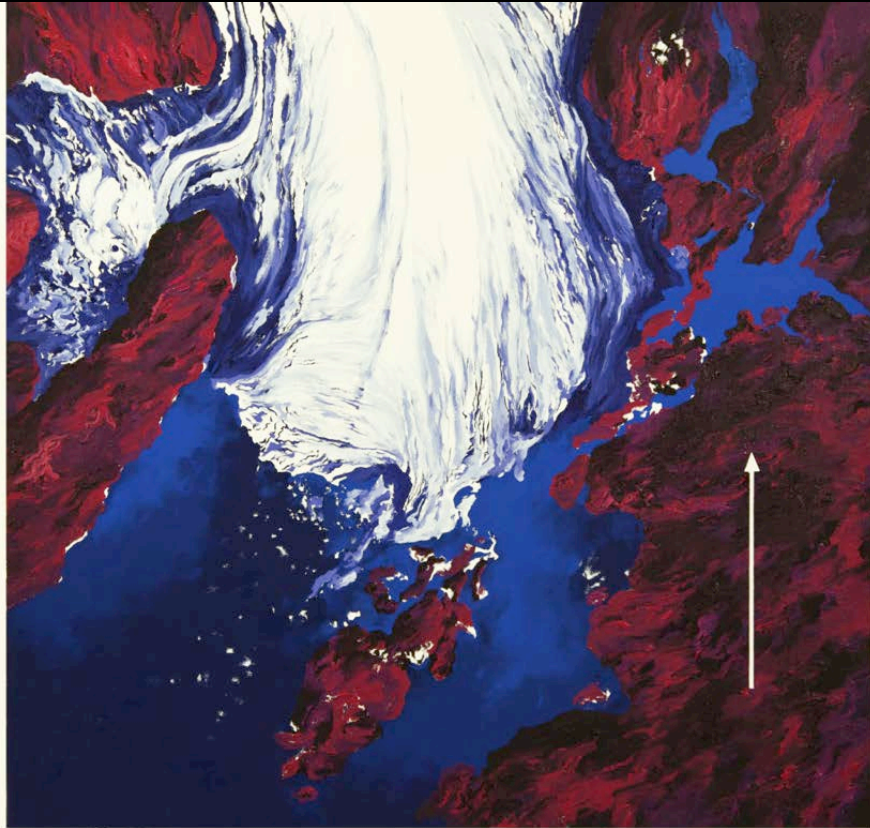


# LANDSAT IMAGERY



Landsat map of Columbia Glacier

COLUMBIA GLACIER #2, 1978  
(AHAP Aerial USGS)  
2012 50 x 60 inches







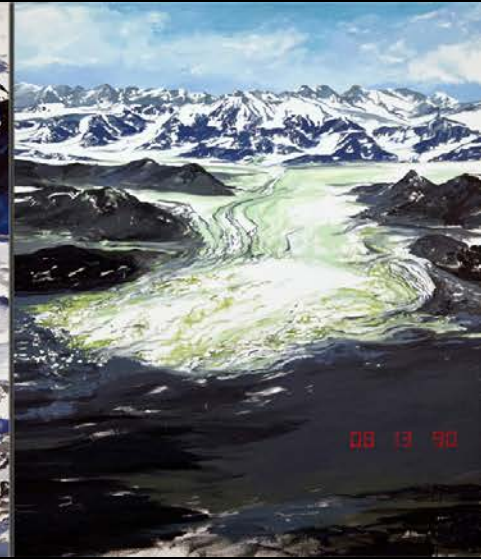
After BRADFORD  
WASHBURN 1938



after AHAP Aerial  
USGS 1978



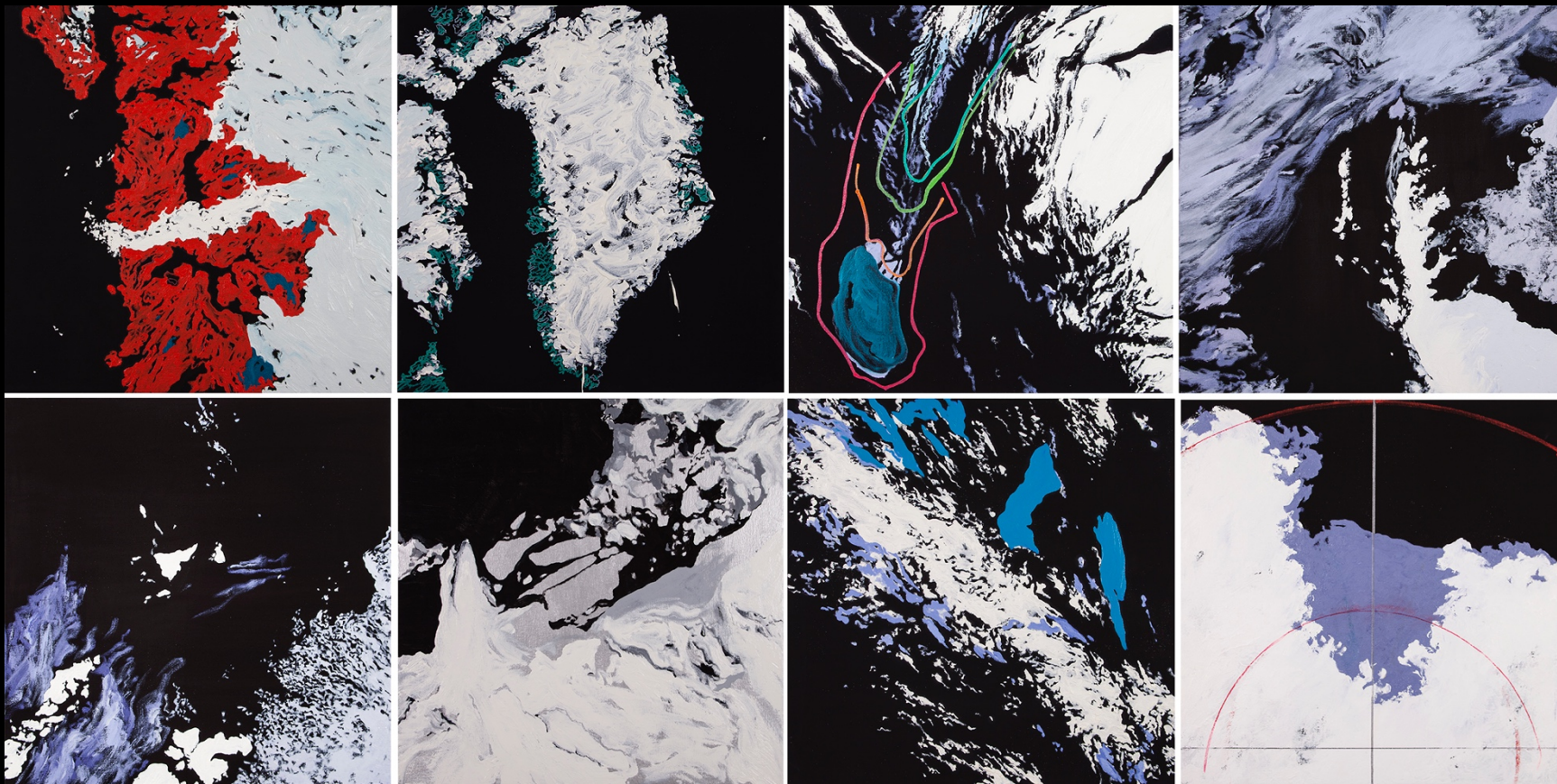
after BRUCE MOLNIA 2010



after USGS 1990

**Columbia Glacier #1, #2, #3, #4, 60"x200", 2011**





LANDSAT SERIES 1-8

2015

40x80 inches each

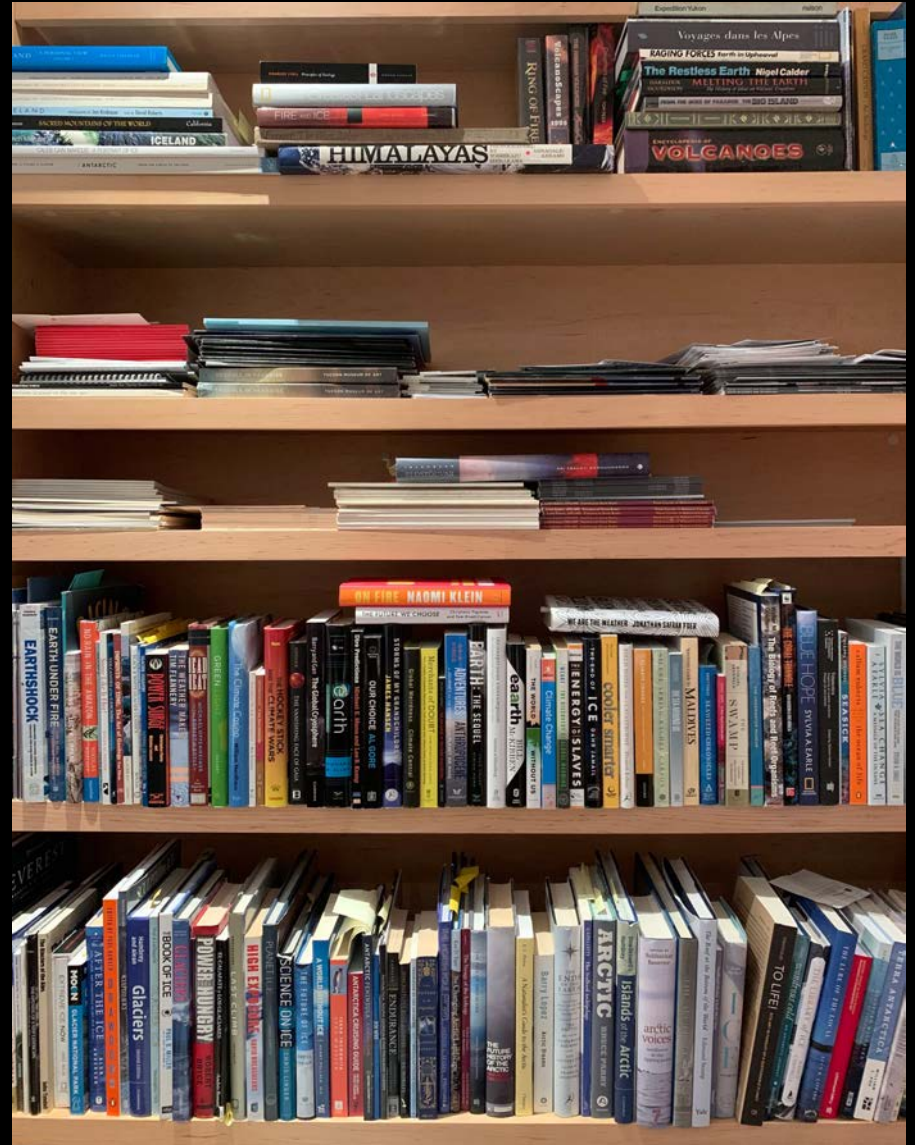
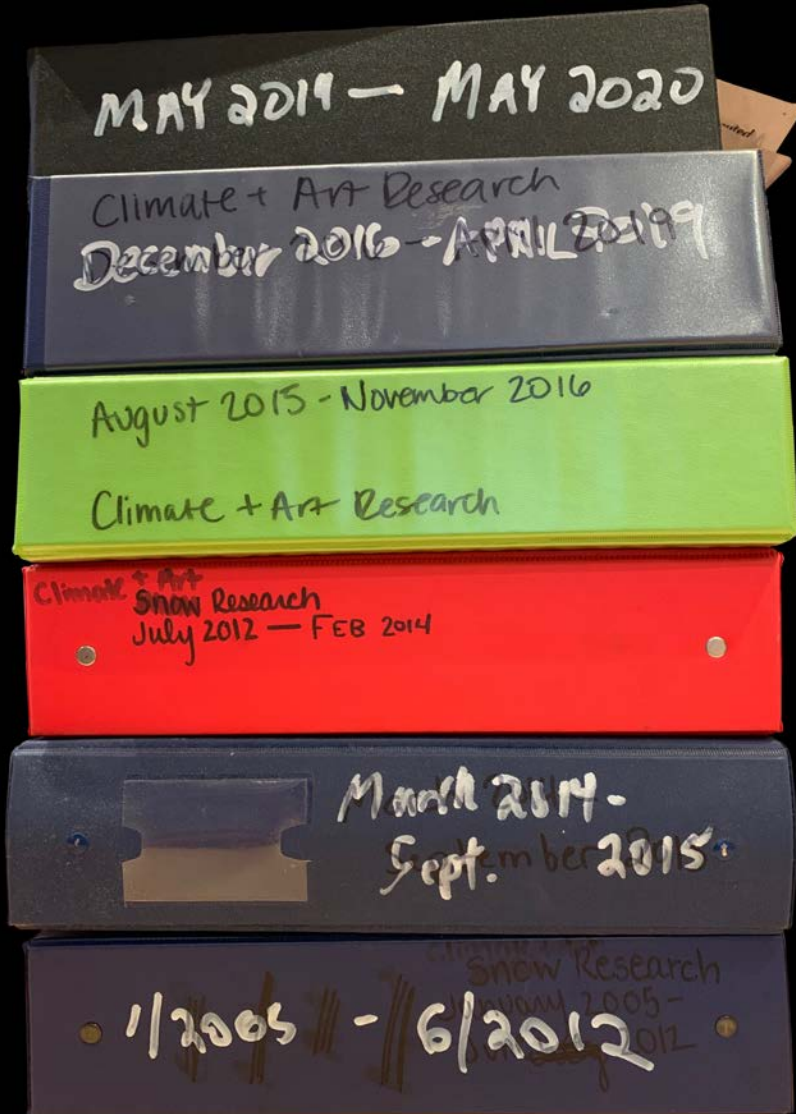




Installation, *VAST AND VANISHING*, Rowan University, 2-4, 2018



# LEARNING FROM SCIENTISTS BY READING





# Breakaway iceberg raises climate alarms

## Four times size of manhattan

David Crossley, Aug 11, 10.

Share This



A chunk of ice only slightly smaller than the area of Loop 610 in Houston - four times the size of Manhattan - broke away from Greenland and may drift toward shipping lanes in the North Atlantic and off the Canadian coast, according to researchers cited in a [Bloomberg news story](#).

Other stories note that the glacier broke on [the anniversary of global warming](#), that the Greenland ice sheet faces a ["tipping point" in 10 years](#), and that ["killer heat waves and retreating ice sheets"](#) raise climate alarms.

From Bloomberg:

The 100-square mile ice island, with enough stored water to keep the Hudson River flowing for more than two years, split

off from the Petermann Glacier last week, according to Andreas Muenchow, an associate professor of ocean science and engineering at the University of Delaware.

The ice is the largest to detach from an Arctic glacier since 1962 and follows the six warmest months on record. Glaciers in Greenland and Antarctica are melting faster than predicted, accelerating their march to the sea and adding to the rising ocean levels that threaten coastal communities worldwide, according to many scientific studies.

"So far, 2010 has been the hottest year on record, and scientists agree Arctic ice is a canary in a coal mine that provides clear warnings on climate," said U.S. Representative Edward Markey, a Democrat from Massachusetts and chairman of the Select Committee on Energy Independence and Global Warming, on the panel's website.

# ABOUT PETERMANN GLACIER



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Where every day is Earth Day

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[download](#) large image (716 KB, JPEG, 2000x2600)

[download](#) GeoTIFF file (7 MB, TIFF, 2000x2600)

[download](#) Google Earth file (KMZ)

acquired July 20, 2011

acquired July 20, 2011

acquired July 20, 2011

In August 2010, the Petermann Glacier along the northwestern coast of Greenland calved an ice island roughly four times the size of Manhattan. Nearly a year later, on July 20, 2011, a piece of that ice island—named Petermann Ice Island-A (PII-A) and about the same size as Manhattan—was still visible to the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's [Terra](#) satellite.

The Canadian Ice Service (CIS) tracked the ice island as it drifted through the Labrador Sea. On July 8, 2011, the CIS reported that the PII-A was approximately 55 square kilometers (21 square miles), and was continuing to lose surface area through calving and melting. On July 20, MODIS observed PII-A slightly south of where it had been a month earlier.

On July 21, 2011, MSNBC reported that PII-A was slowly drifting toward Newfoundland. The glacier was not likely to reach land; its base would probably become grounded on the sea floor off the coast. The ice chunk did, however, pose a potential hazard for shipping lanes and offshore oil rigs.

### References

Canadian Ice Service (2011, July 8). [Petermann Ice Island Updates](#). Accessed July 22, 2011.

MSNBC. (2011, July 21). [Massive ice island drifts toward Canada](#). Accessed July 22, 2011.

NASA image courtesy Jeff Schmaltz, [MODIS Rapid Response](#), NASA Goddard Space Flight Center. Caption by Michon Scott.





Entrance to the WALTON ARTS CENTER show, 2017



# BEARING WITNESS



**On Kronebreen Glacier, Svalbard**

**9/17/13**



KRONEBREEN

GREENLAND

ANTARCTICA

NEW ZEALAND

INVESTIGATING  
GLACIAL MELT

NORTH

AND

SOUTH



2013

2014

2015

2017





ON RAUDFJORD BEACH OF ICE, September 2013



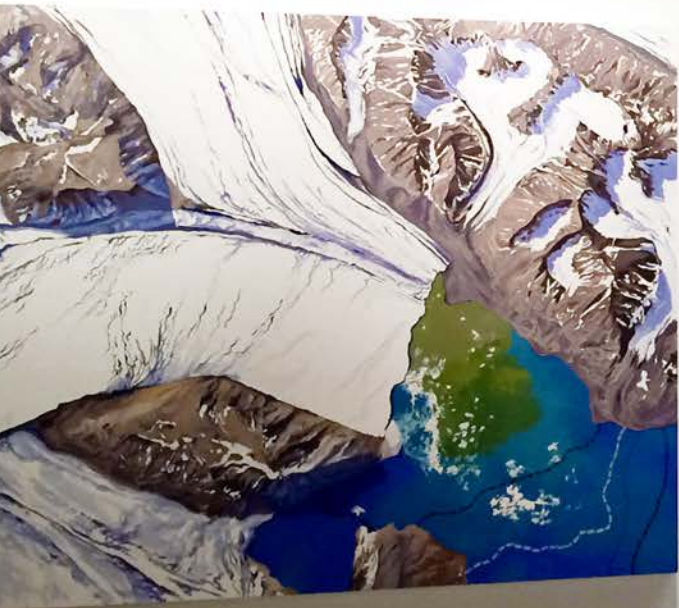


FLYING UP KRONEBREEN      September 17, 2013









STUDIO: 2014





*GLACIAL SHIFTS, Bearing Witness to Climate Change, Walton Arts Center, Arkansas, 2017*



LEARNING FROM SCIENTISTS

IN THE FIELD



KRONEBREEN, SVALBARD, with Dr. Jack Kohler, NPI, September, 2013



# LEARNING from SCIENTISTS at CONFERENCES

## CLIMATE LITERACY:

The Arts as an Ally in  
Invoking Change  
AGU

December 15,  
2016

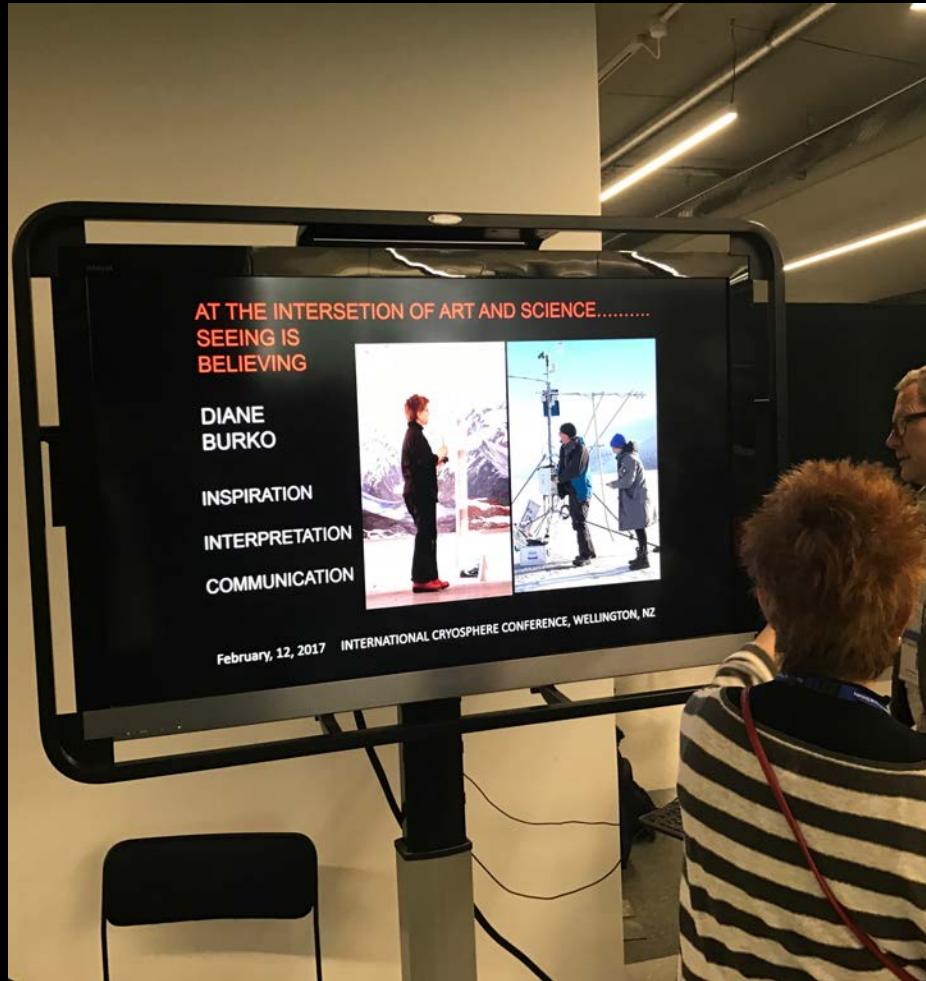
DIANE  
BURKO



Engagement in Climate Change Awareness through  
ART EXHIBITIONS



# INTERNATIONAL CRYOSPHERE CONFERENCE, NZ, 2017



AT OPENING RECEPTION



SPEAKING WITH ERIC RIGNOT AFTER  
HIS KEYNOTE ADDRESS





DEMONSTRATION BY SCIENCE COMMUNITY AT AGU 2016



**REFOCUSING ON THE OCEANS**

# CLIMATE CHANGE IS DESTROYING OUR REEFS.

**WE MUST PHASE OUT COAL.**

We, the undersigned, have collectively devoted over 1,200 years studying climate change, marine ecosystems and the reef. We know that the burning of fossil fuels is severely damaging our Great Barrier Reef.



OAHU

MOLOKAI

AMERICAN SAMOA

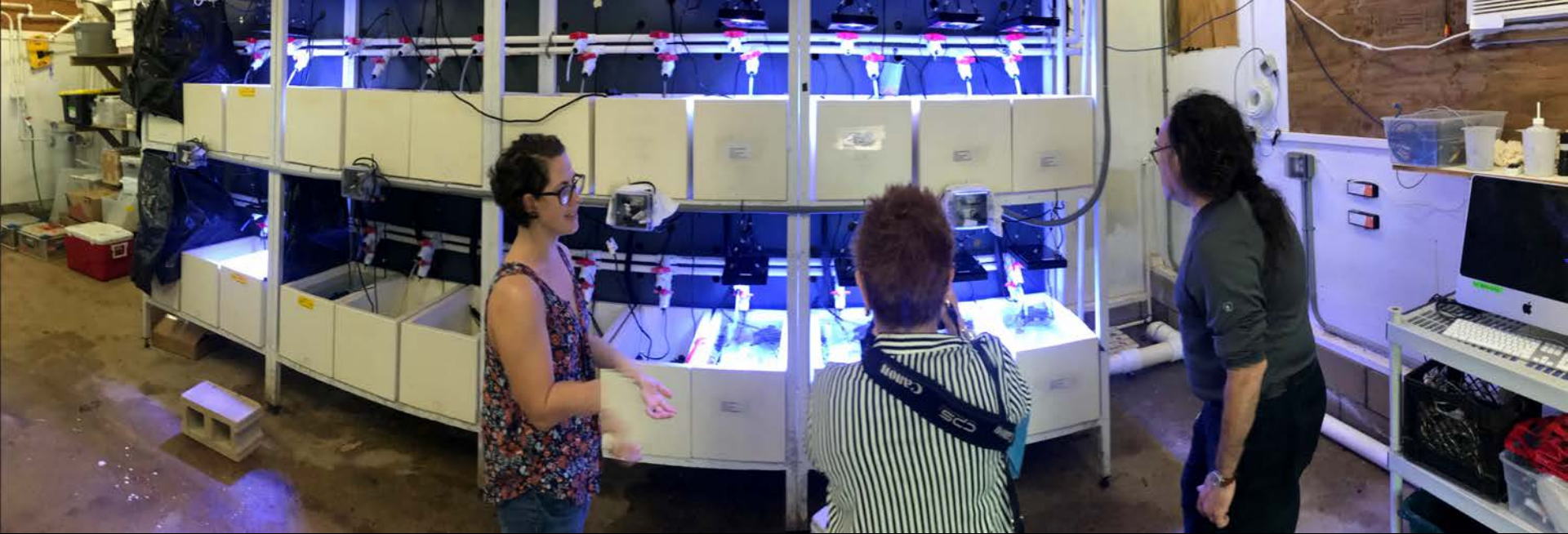
**INVESTIGATING  
CORAL REEFS**



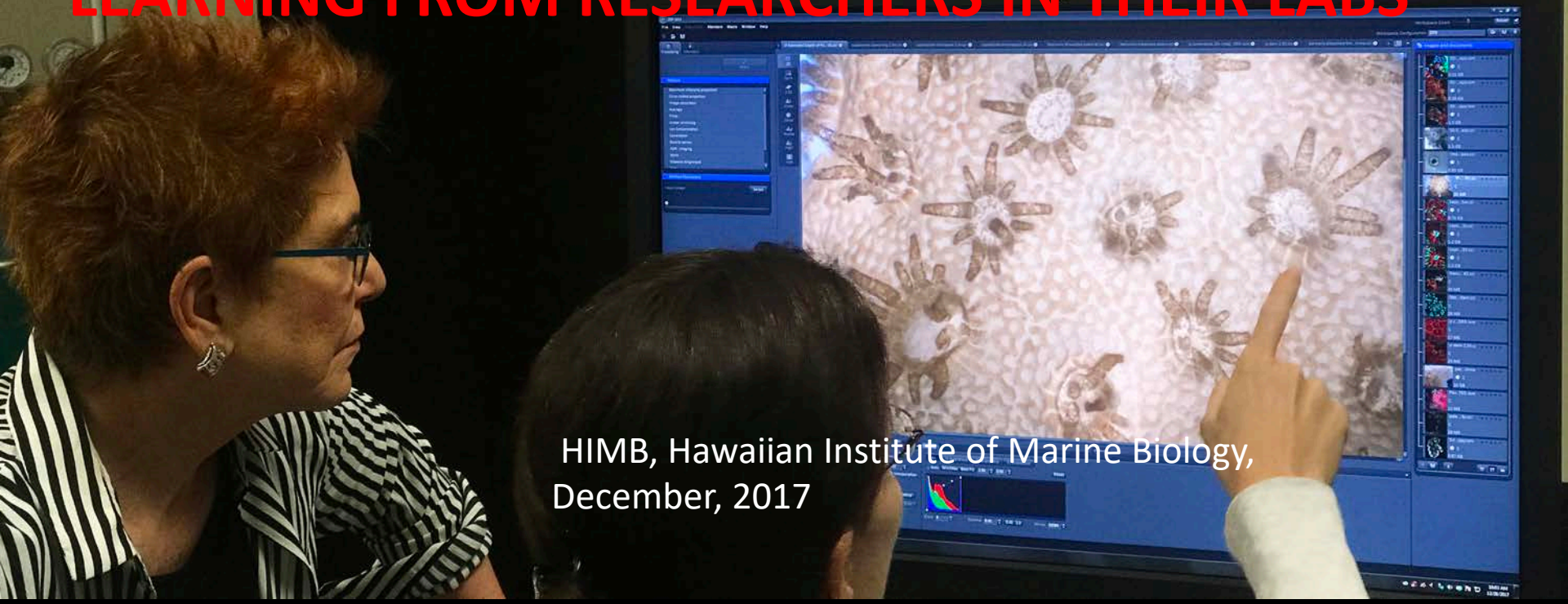
December 2017

January, 2018





## LEARNING FROM RESEARCHERS IN THEIR LABS



HIMB, Hawaiian Institute of Marine Biology,  
December, 2017





HIMB: Wet Labs: Learning about SYMBIONTS,

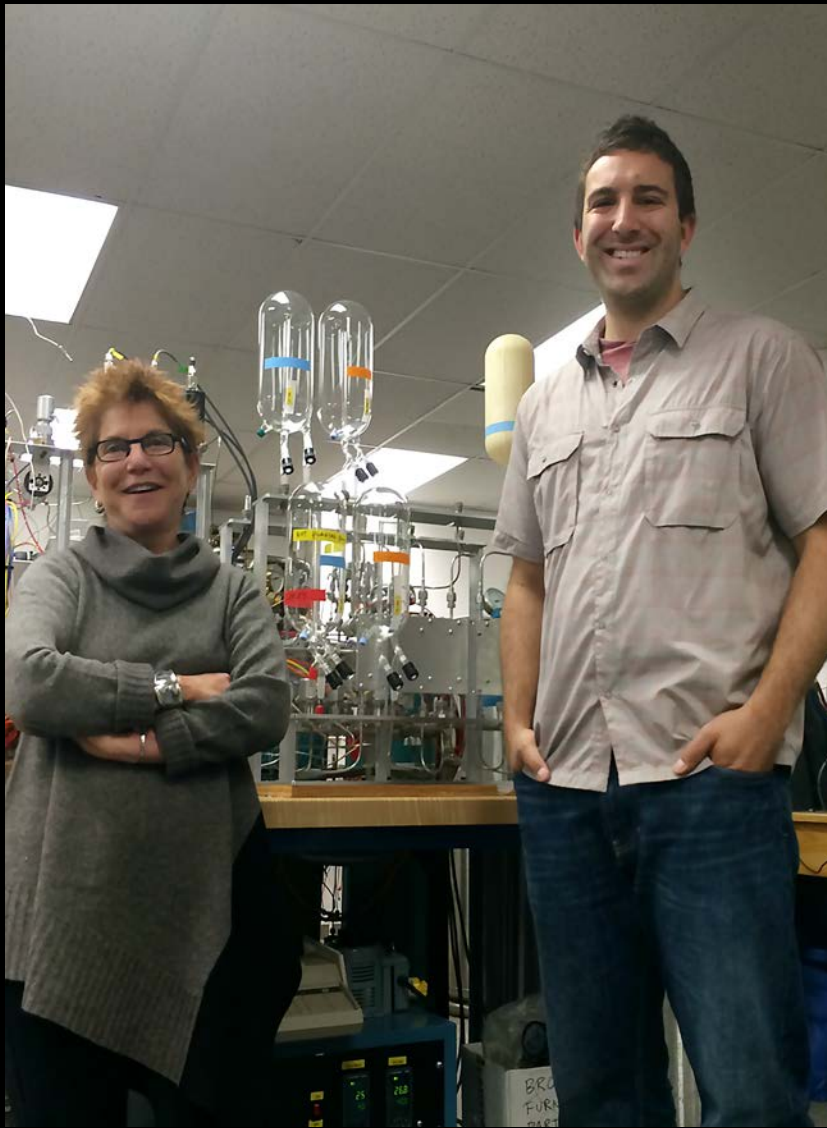




# SCRIPPS INSTITUTE OF OCEANOGRAPHY, @ STUART SANDIN LABS

Marine Biology Research Division, March 1, 2018





INSTARR, BOULDER, CO STUDENTS and LABS

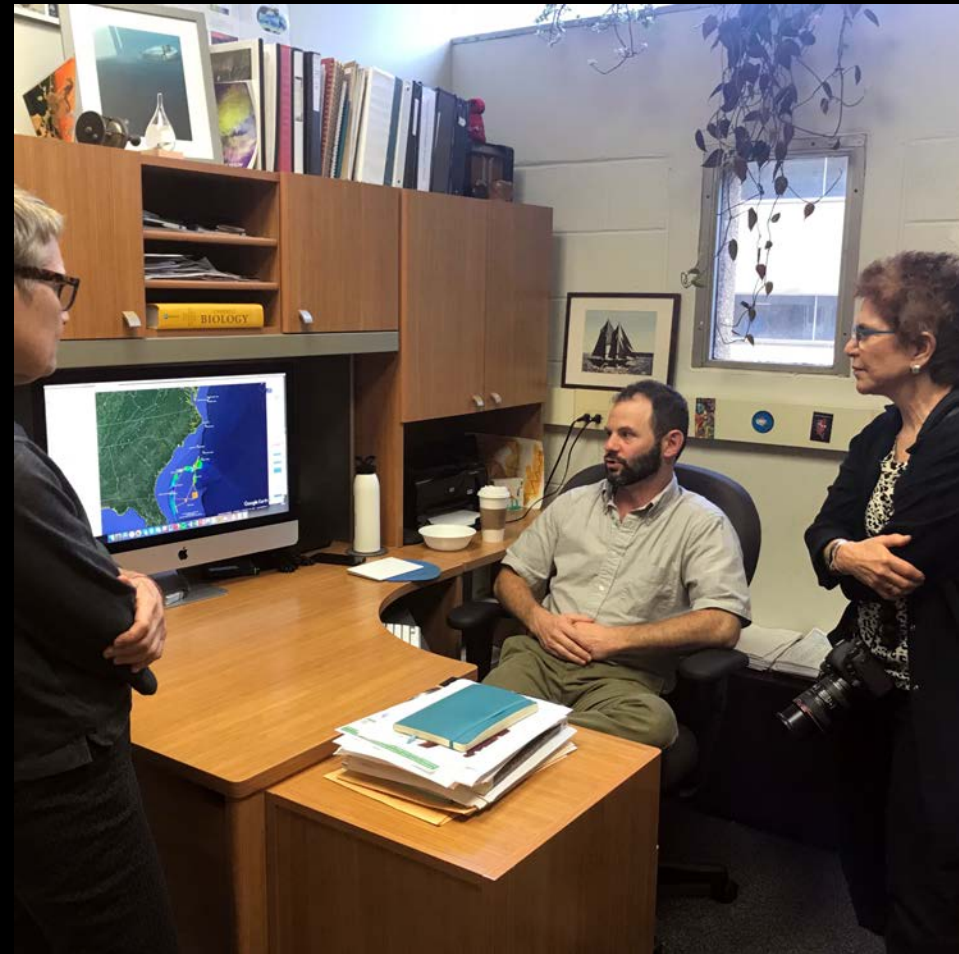
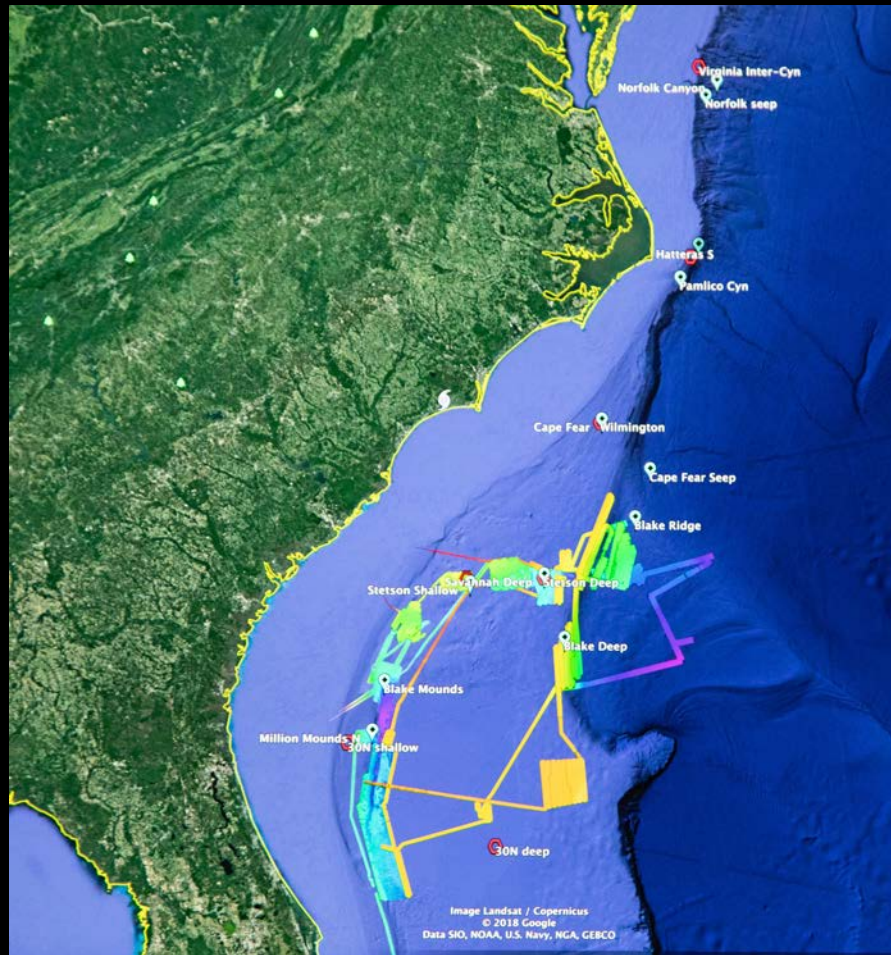
ARCHIVE, November 2014





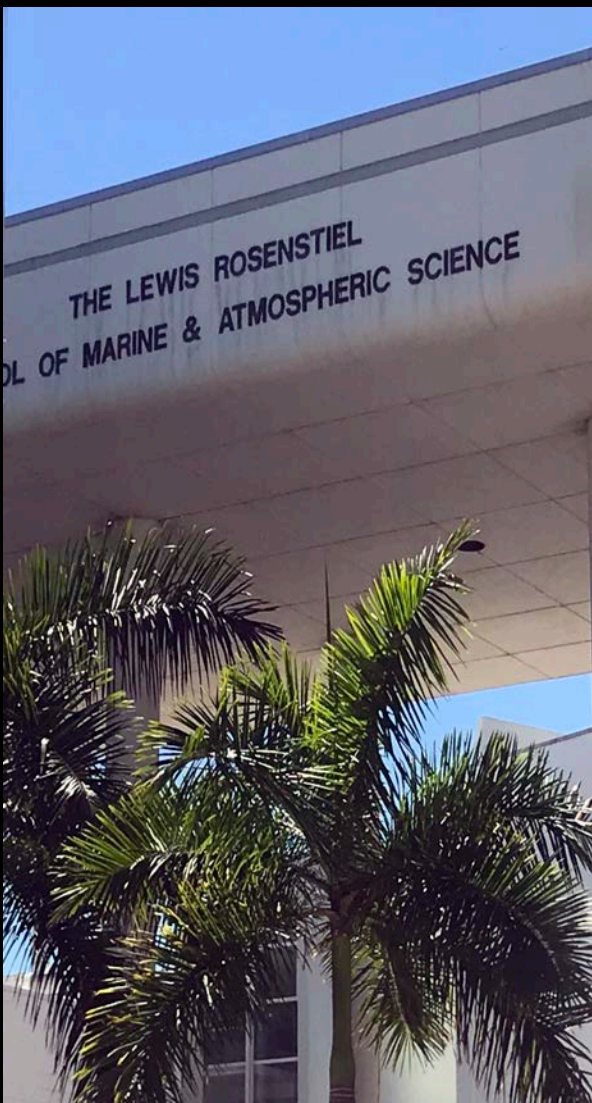
INSTITUTE FOR MARINE AND ANTARCTIC STUDIES, TASMANIA, MARCH 2017





with ERIL CORDES, Lead Scientist, “Deep Search Project” at  
Temple University, September, 2018





UNIVERSITY OF MIAMI, ROSENSTIEL SCHOOL OF  
OCEANOGRAPHIC AND ATMOSPHERIC SCIENCE



# TRANSLATING IN THE STUDIO



**STUDIO: 2010**





STUDIO: 2011





STUDIO: 2015

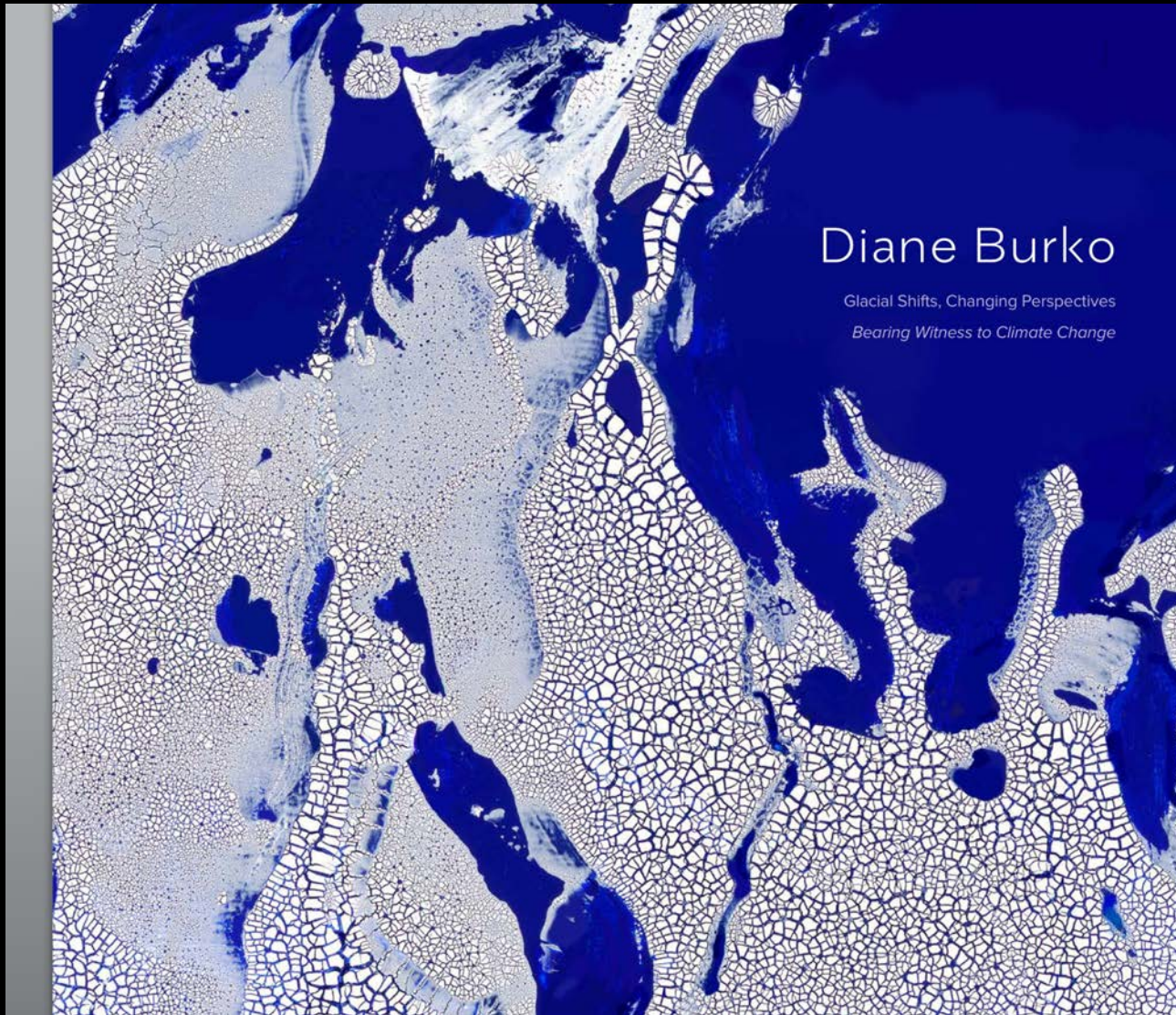




STUDIO with ARCTIC MELTING I and II (unfinished), From NASA WORLD VIEW SITE  
OCTOBER 2016,



WALTON ARTS CENTER, ARKANSAS, MAY-SEPTEMBER, 2017



GLACIAL SHIFTS, CHANGING PERSPECTIVES :  
*Bearing Witness to Climate Change*





GREAT BARRIER REEF, 2017-2018, 60"X84", December 2018





OVER THE GREAT BARRIER REEF, A  
40 x 60 inches, March 2017, Archival inkjet print





**MAKING THE INVISIBLE VISCERAL.....**

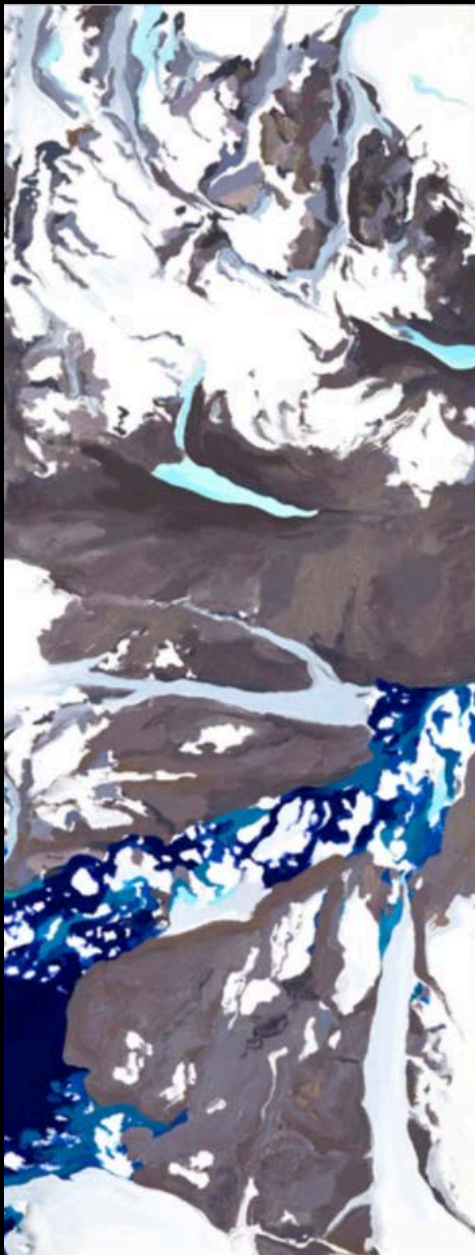




Diane Burko: *Flow*

Small text below the poster, likely describing the exhibition or artist.





DIANE BURKO  
ENDANGERED:  
FROM GLACIERS  
TO REEFS

HAWAIIAN ARCHIVE

**ENDANGERED: FROM GLACIERS TO REEFS**



# CONTINUING to attend CONFERENCES.....

## The Coral Reef Ecosystem: Observation, Configuration, and Communication at the Intersection of Art and Science



**My Art Practices: From Climate Change Impacts on Glaciers To Coral Reefs**

**DIANE BURKO**  
Community College of Philadelphia

For over a decade my practice has embraced issues of climate change, specifically glacial melt. As an artist, I believe the only way I can contribute to the public dialogue is to learn from researchers in the field and then bear witness. I use myself as a viewer of art, creating compelling images which in turn inform the public of the dire threats to our planet. My presentation will briefly review recent exhibitions on glacial melt, up to the present current exhibition here at the National Academy of Sciences, as well as my public engagement activity.

My attention is now focused on how issues of climate change are threatening the heat that oceans and coral reef ecosystems in particular. This redirection began in March 2017 exploring the Great Barrier Reef, then seeing the compelling film *Chasing Coral* that summer, and then joining a project called 'Kai-Apa Pa' which took me to the 'reef' for a month-long investigation this year. Visits to labs at the Marine Life Institute of Marine Biology, Scripps Institution of Oceanography and Temple University Center for Biodiversity & Evolutionary Biology led to the valuable knowledge needed to create the current exhibition: *Endangered: From Glaciers to Reefs*.



### Endangered: From Glaciers to Reefs

The core of the text features a conversation between artist Diane Burko and anthropologist Ben Orlove of Columbia University with essays on glaciers by Ted Hunter from MIT and on coral reefs by Nancy Knowlton, Marine Biology at the Smithsonian Institution.

This far-ranging exchange includes not only commentary on the work in the exhibit but integrates ideas about climate change, geography, history, the human condition and the creative process.



**Abstract Data Visualization: An ongoing work by Diane Burko, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 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# NATIONAL ACADEMY OF SCIENCES

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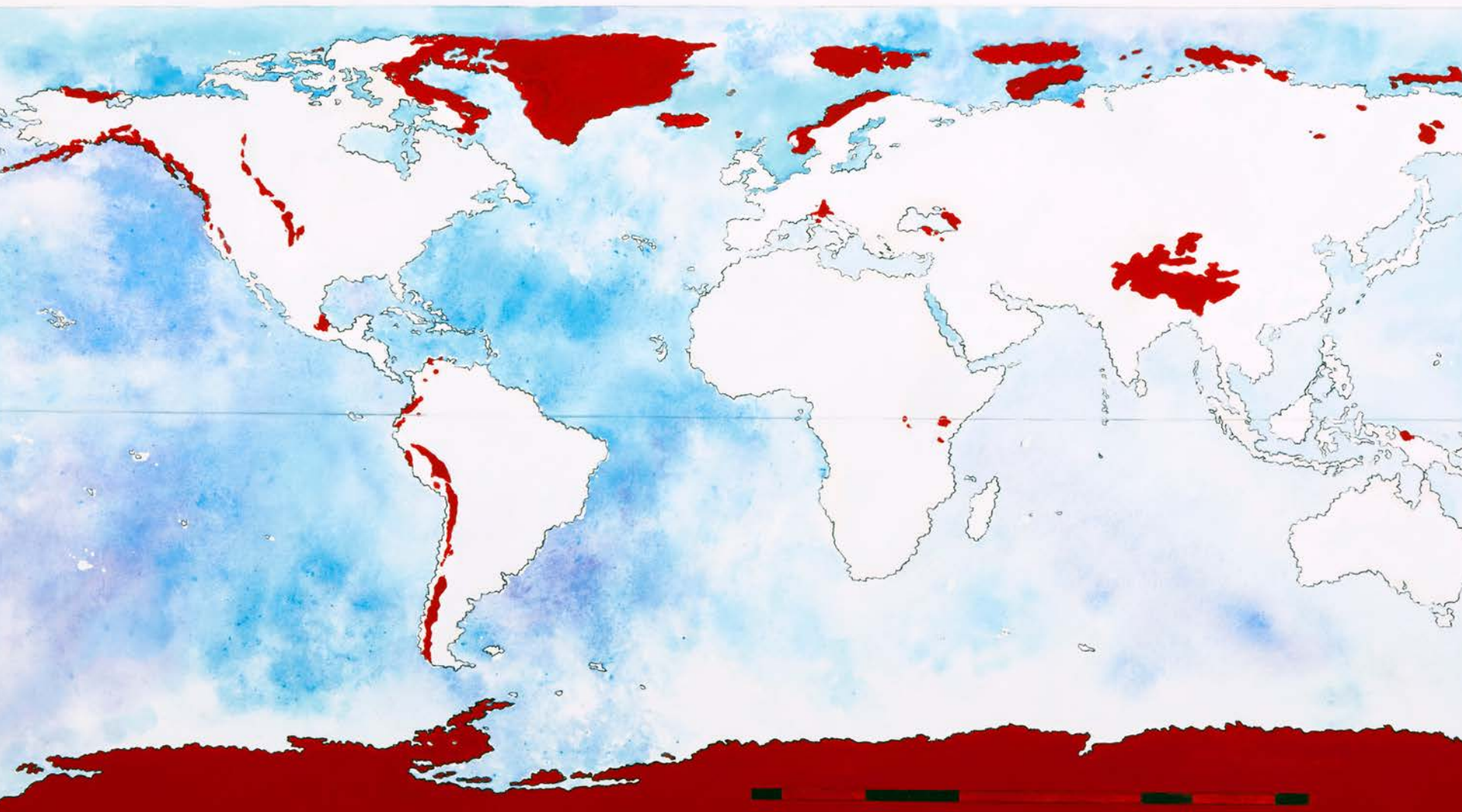


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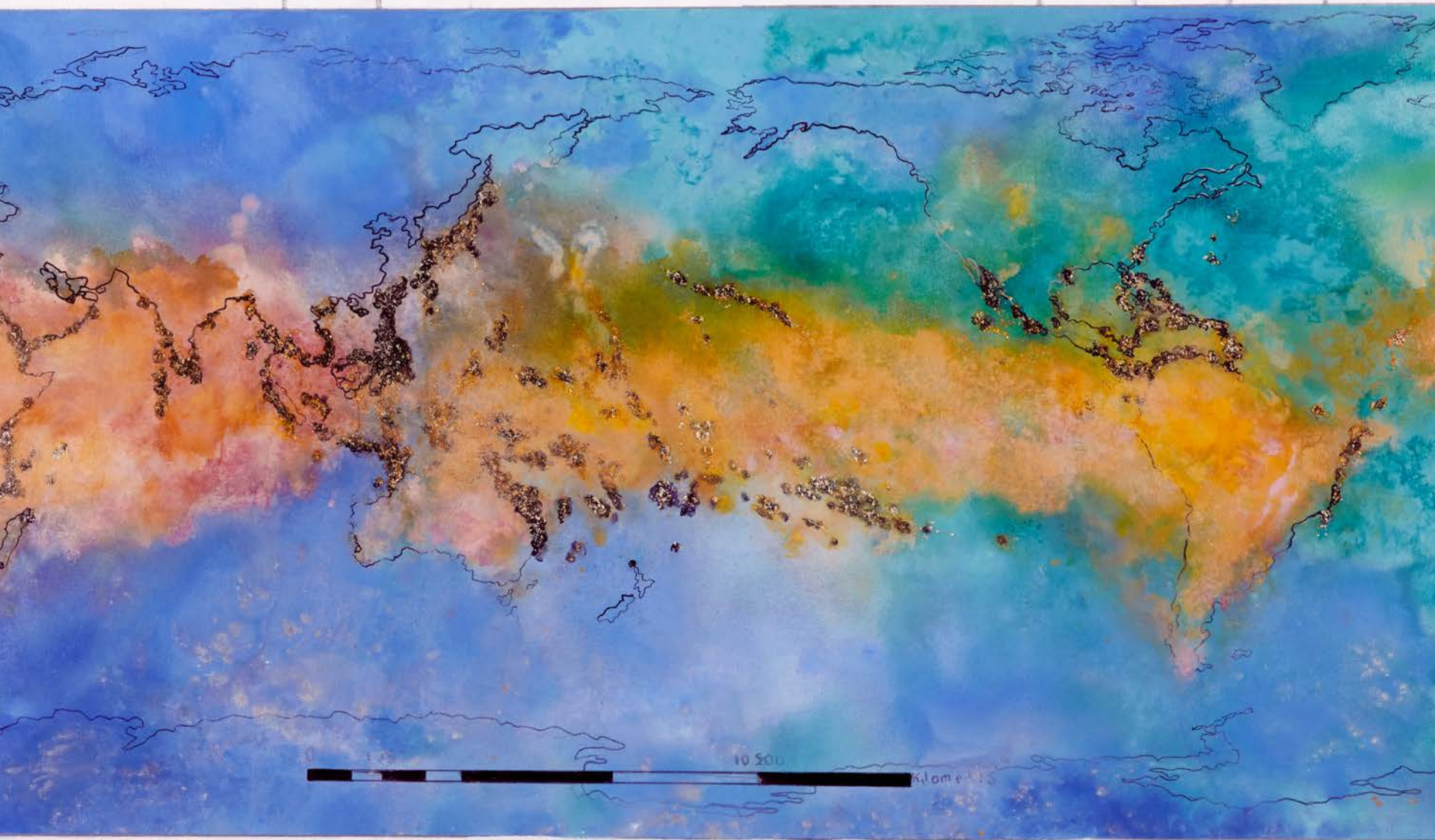




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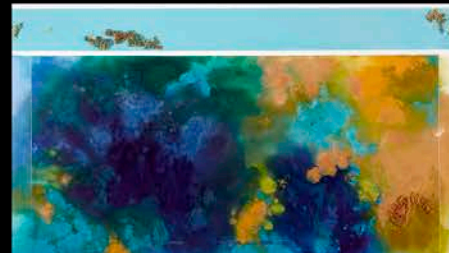
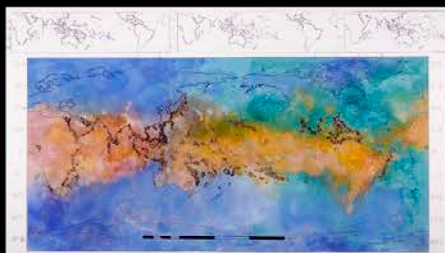
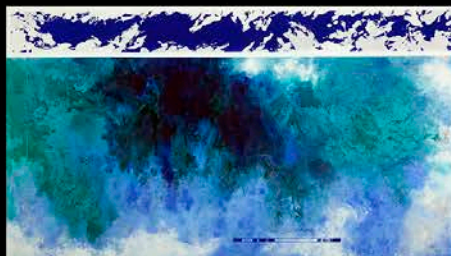
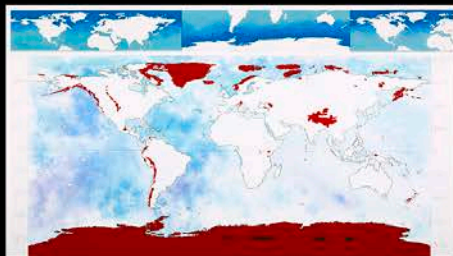






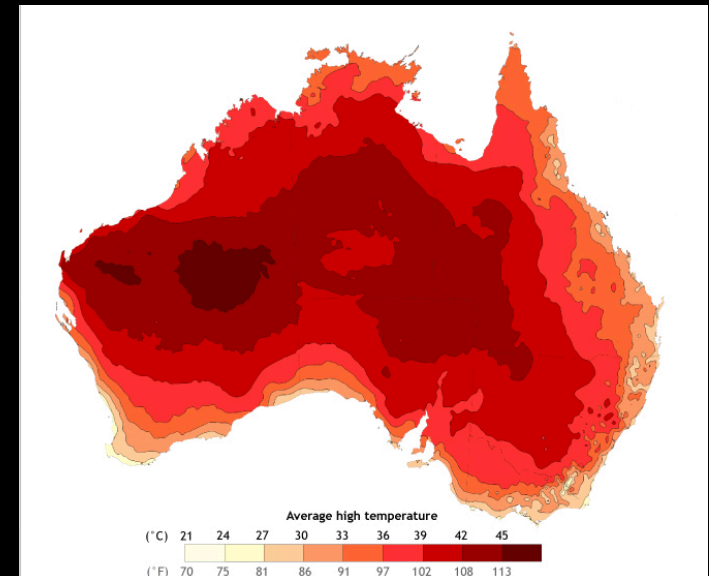
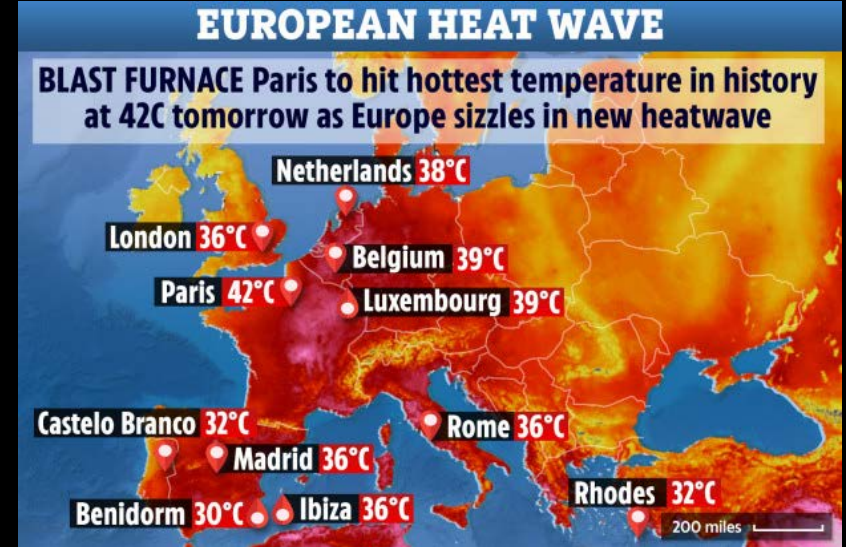
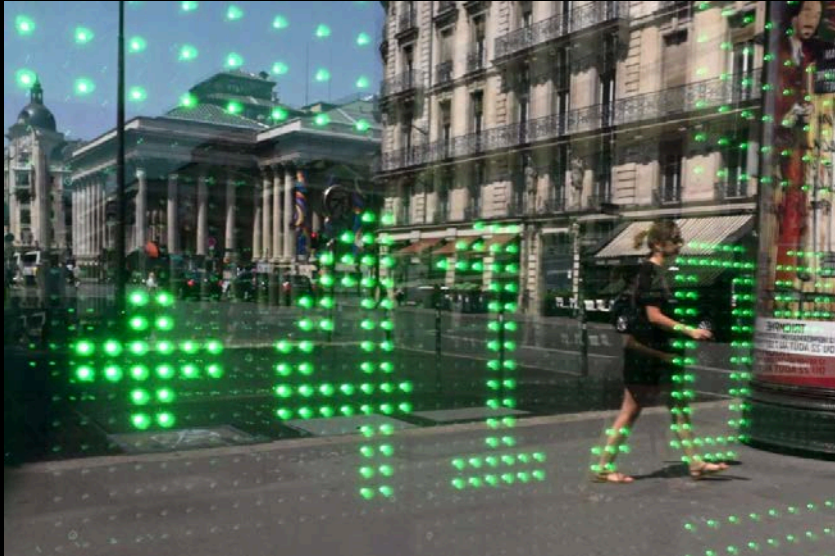




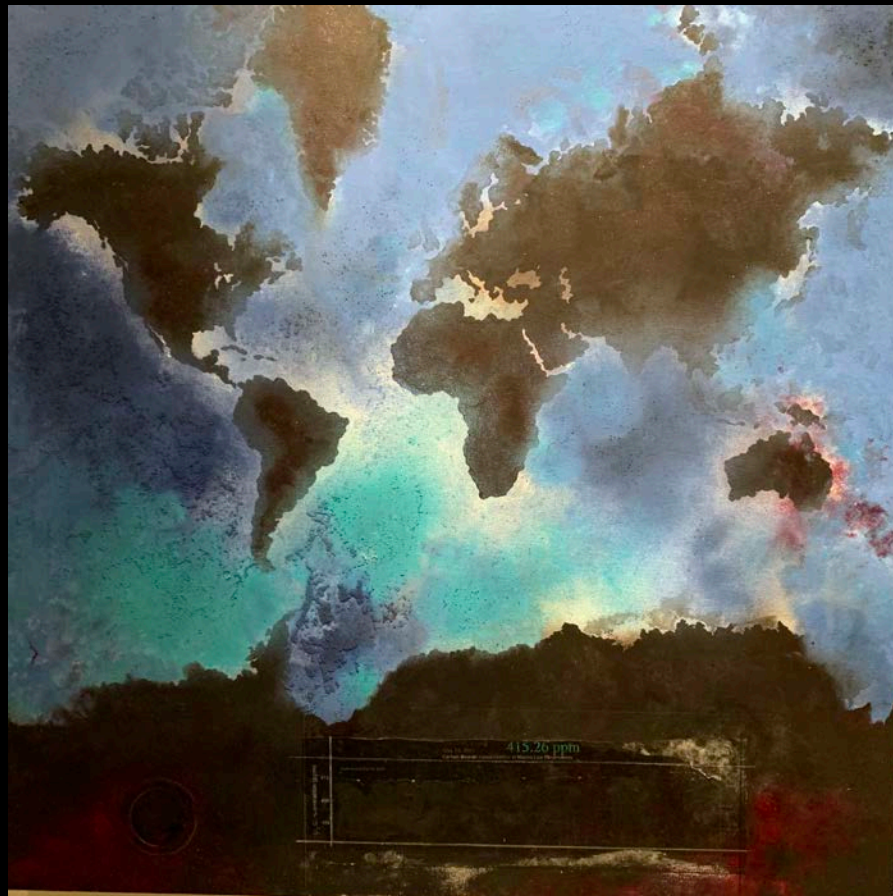




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