Swiss Re

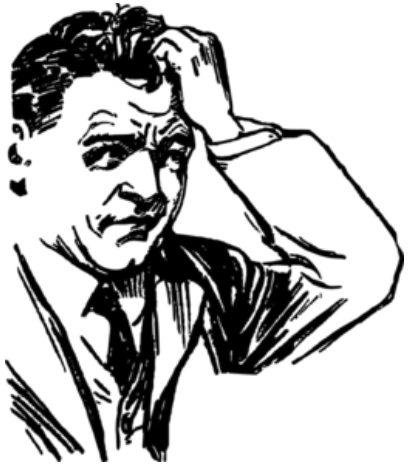
Short Memories and Long Faces

Extreme weather events, unusual, unprecedented, abnormal...or

CAS
Nov 5, 2013
Andrew Castaldi

SWISS RE
150
YEARS

Short Memories and Long Faces



- How do we judge what is a trend?
  - Recent memory
  - Selective memory
  - Historical data and statistical bias
  - Trends or Normal Variation
  - Cat model opinions
  - Perceptions (ours or others [media])

How many of you are NFL Football fans?

How many of you follow the Super Bowl?

Who lost the Super Bowl in 2009?

Swiss Re

Table of Contents / Agenda

Swiss Re

Climate Change

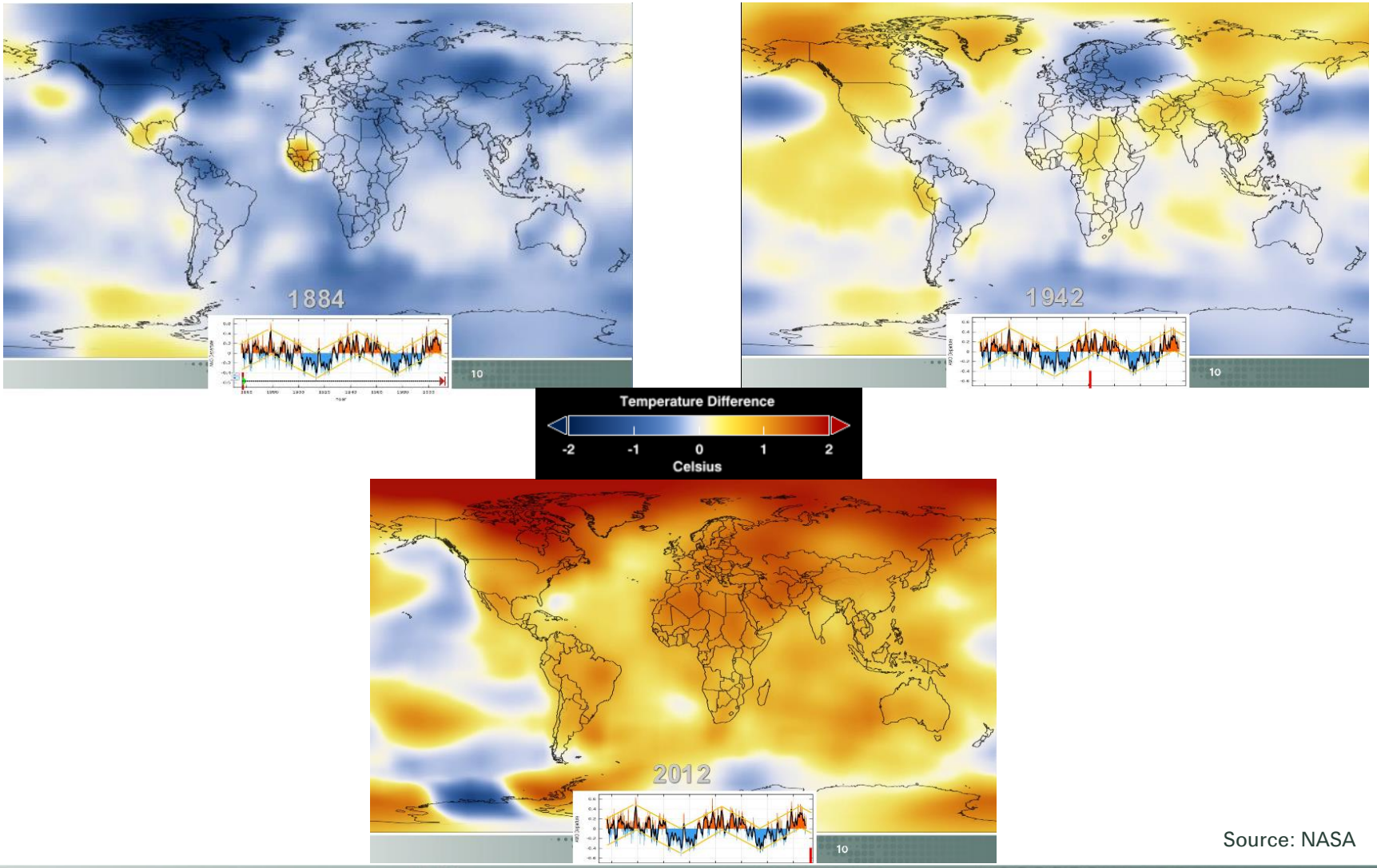
- Are We getting warmer?

The last 120 Years

Swiss Re

Source:NASA

Global anomalies during active (warm) AMO



Source: NASA

Swiss Re

Catastrophe Losses

- Are they increasing?

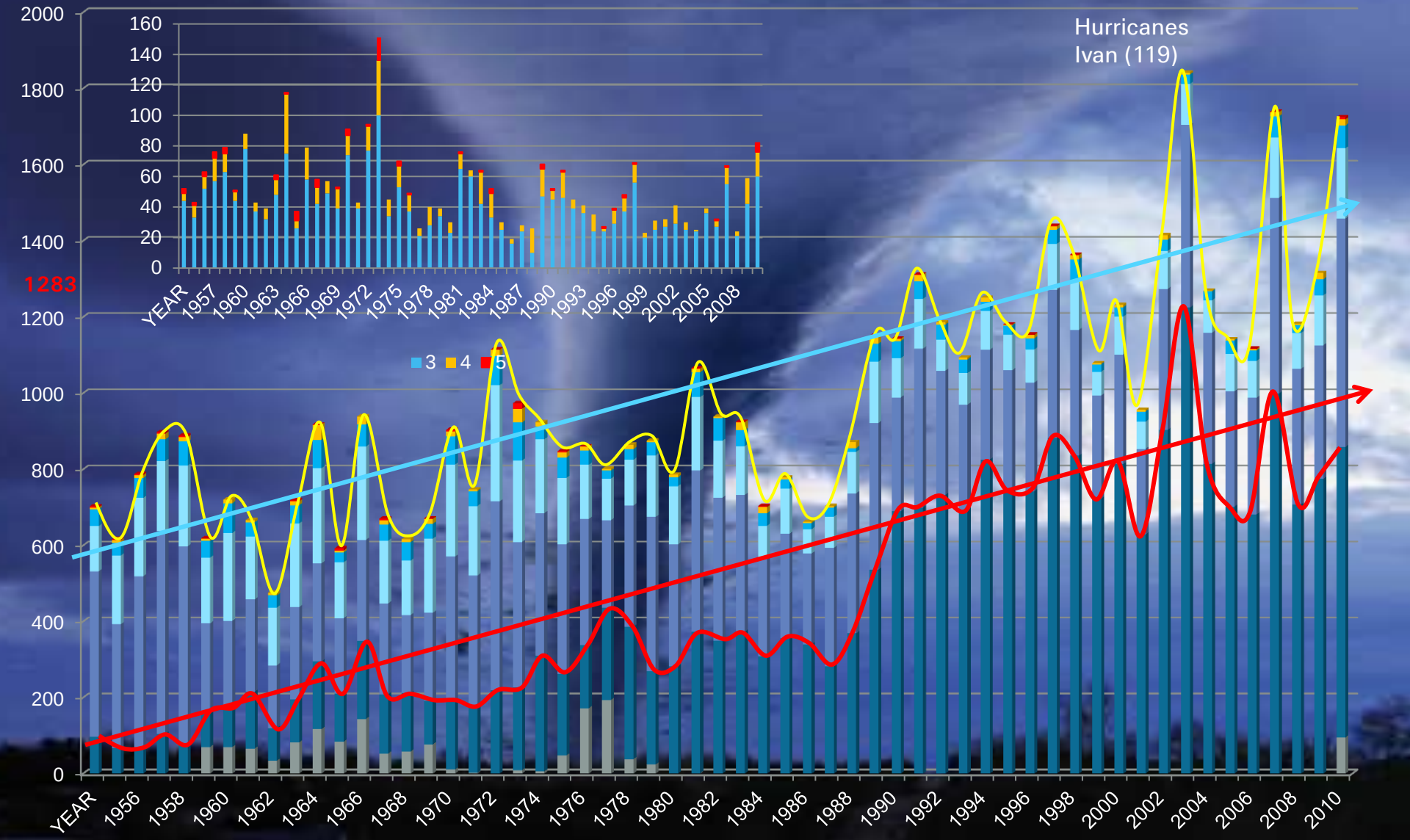
Trend in losses moving upwards

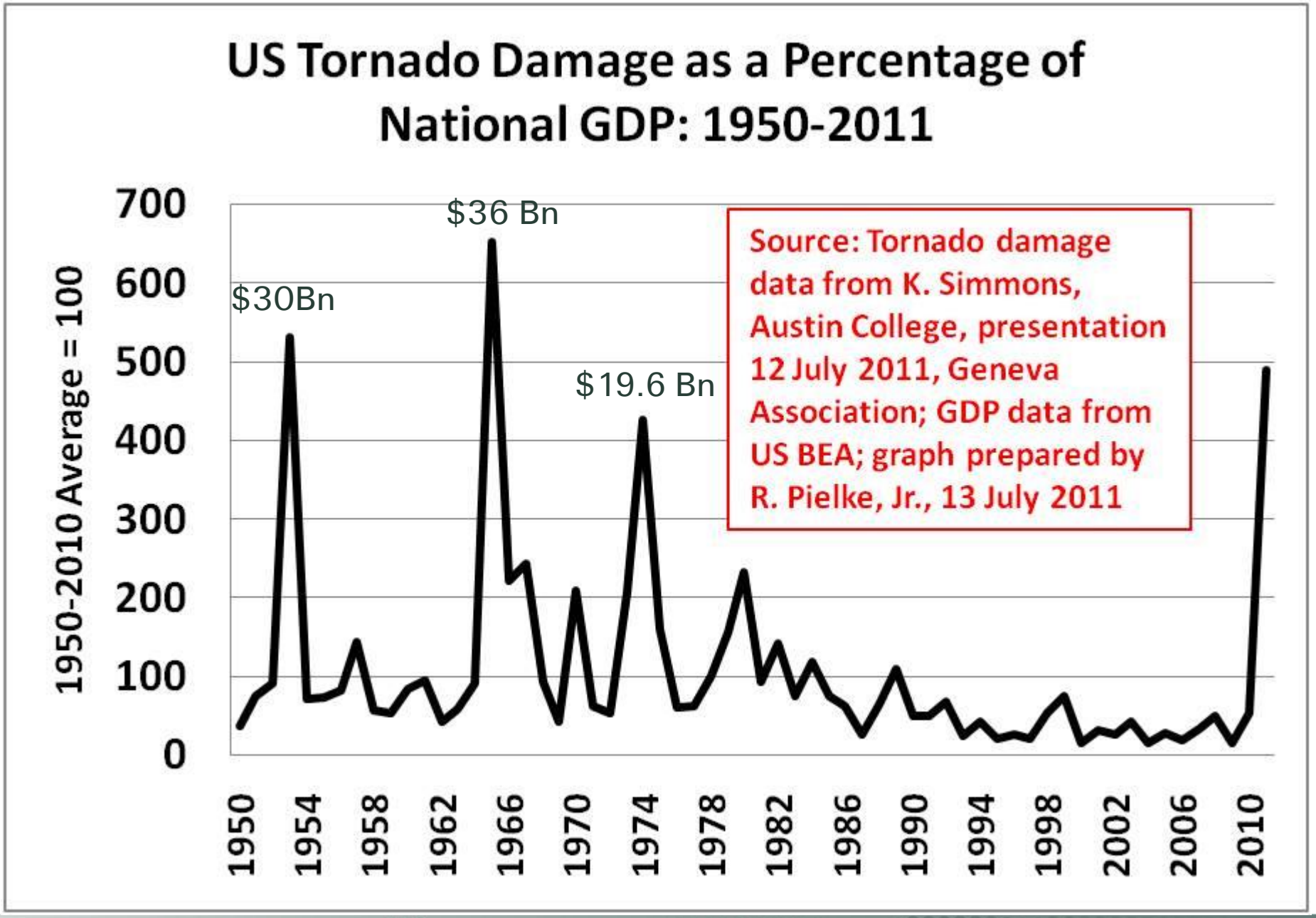
Swiss Re

Catastrophe Losses and Climate Change

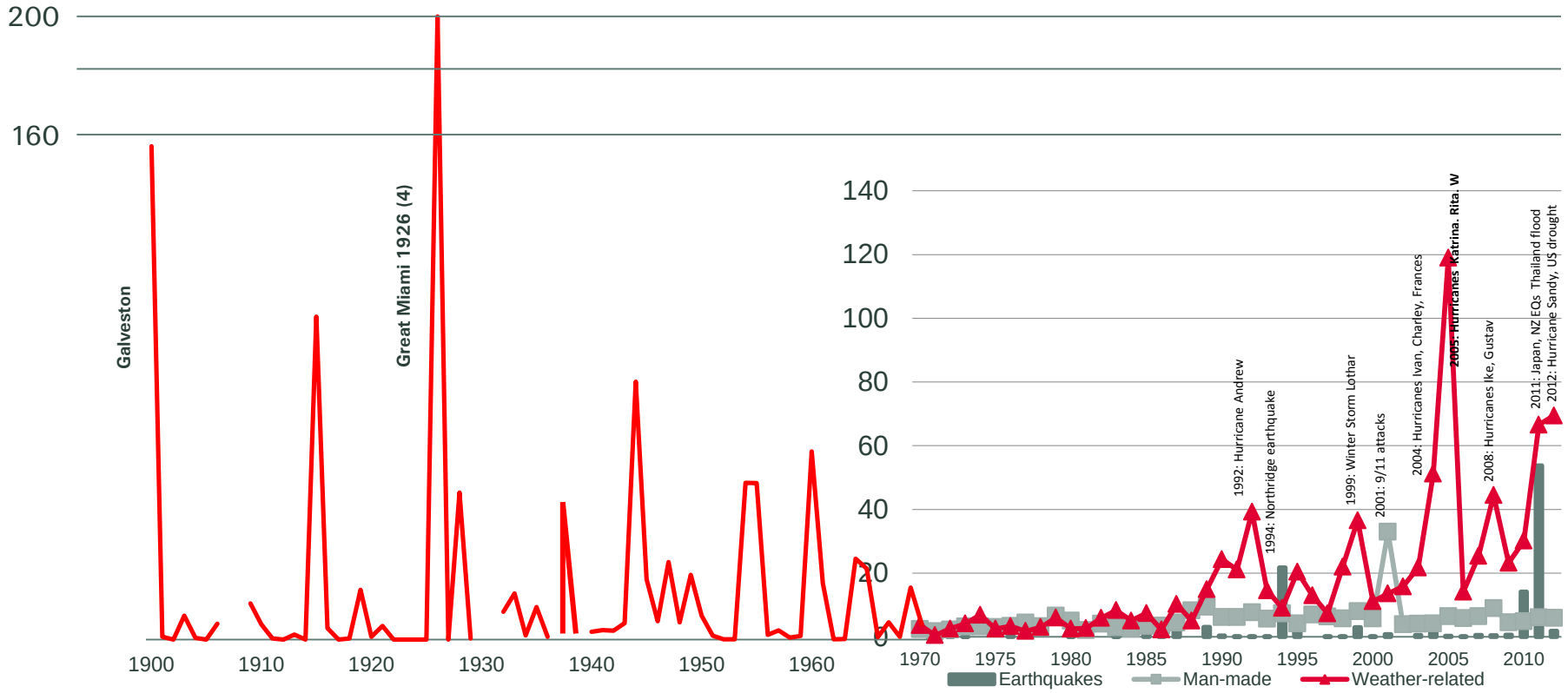
- Are they related?

Tornado Historical Record




US Tornado Damage as a Percentage of National GDP: 1950-2011
1950-2010 Average = 100
700
600
500
400
300
200
100
0
$30Bn
$36 Bn
$19.6 Bn
Source: Tornado damage data from K. Simmons, Austin College, presentation 12 July 2011, Geneva Association; GDP data from US BEA; graph prepared by R. Pielke, Jr., 13 July 2011
1950
1954
1958
1962
1966
1970
1974
1978
1982
1986
1990
1994
1998
2002
2006
2010

But when we go back a bit further



Normalized to 2012 dollars, population density, and wealth

Natural catastrophes insured losses

Swiss Re

- Increasing population
- Increasing values
- concentration in exposed areas
- Insurance penetration
- Changing hazard
  - climate variability
  - climate change

Ocean Drive, FL, 1926.

Ocean Drive, FL, 2000.

Population Growth Rates (1960-2000)

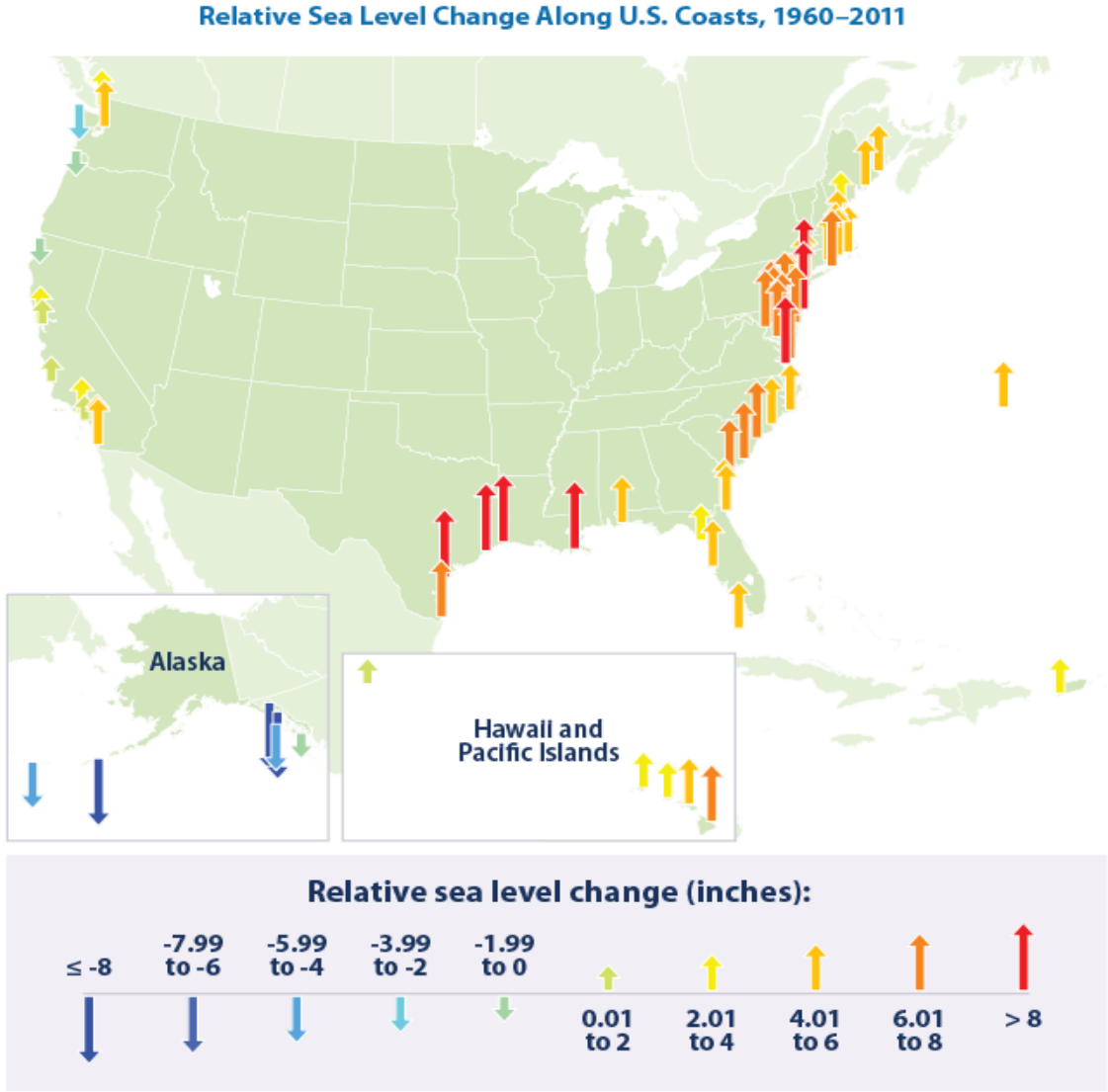
All US	+57%
Florida	+223%

The Real Culprit

Swiss Re

One Consequence of Climate Change we can not deny

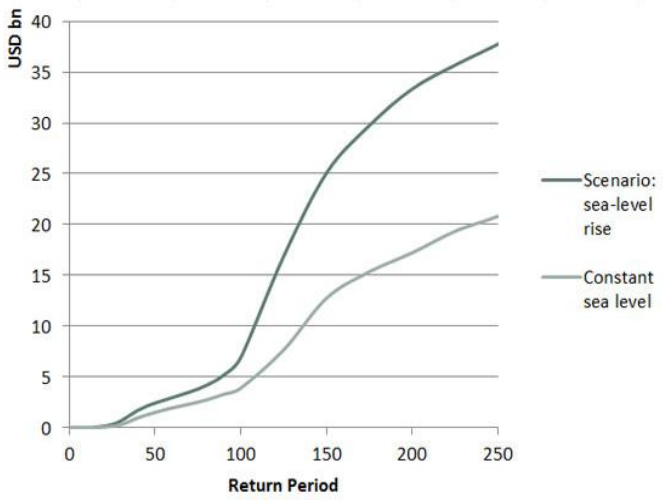
- Sea Level Rise



Data source: NOAA (National Oceanic and Atmospheric Administration). 2012 update to data originally published in: NOAA. 2001. Sea level variations of the United States 1854–1999. NOAA Technical Report NOS CO-OPS 36. http://tidesandcurrents.noaa.gov/publications/techrpt36.pdf.

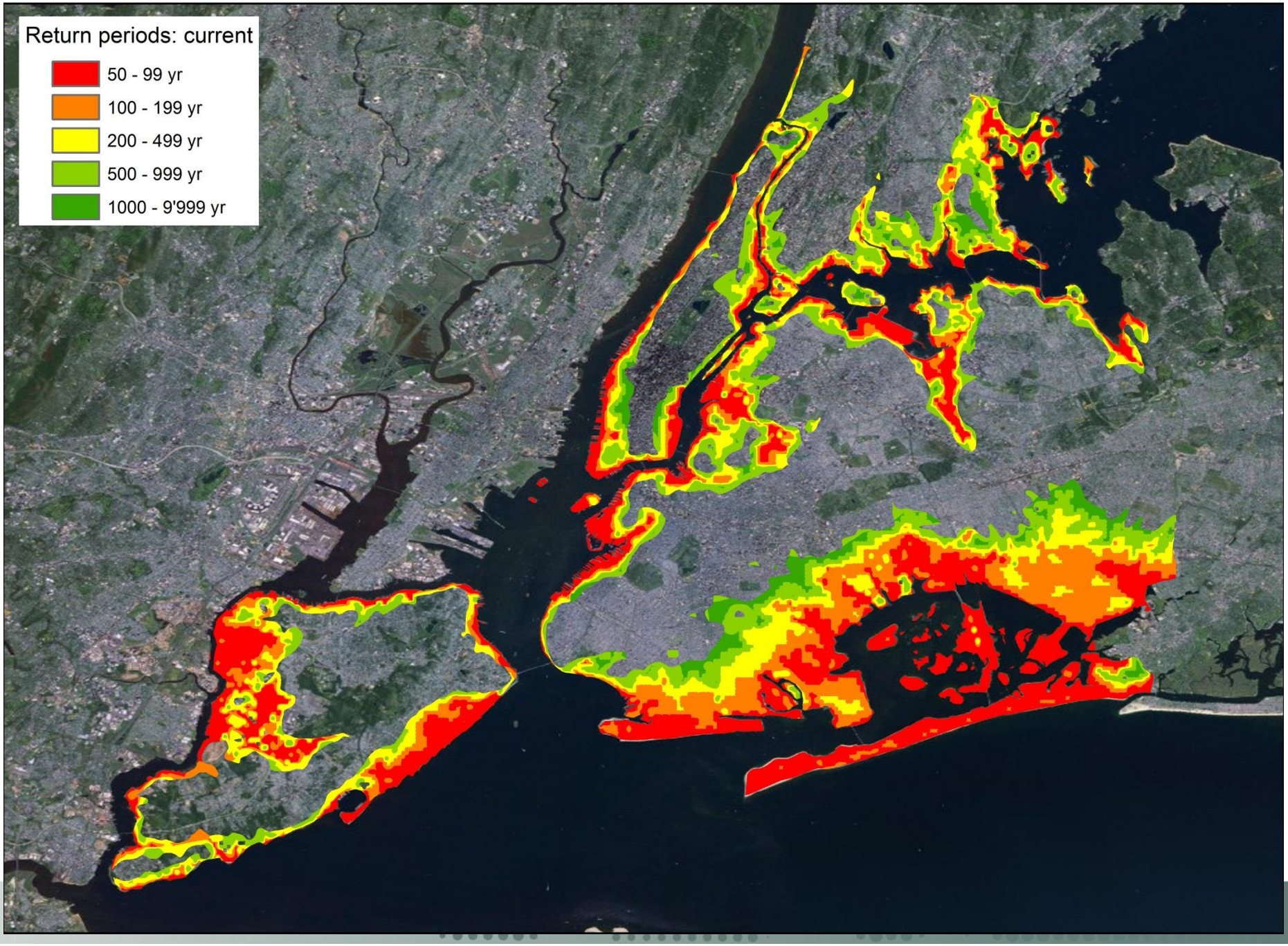
For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climatechange/indicators.

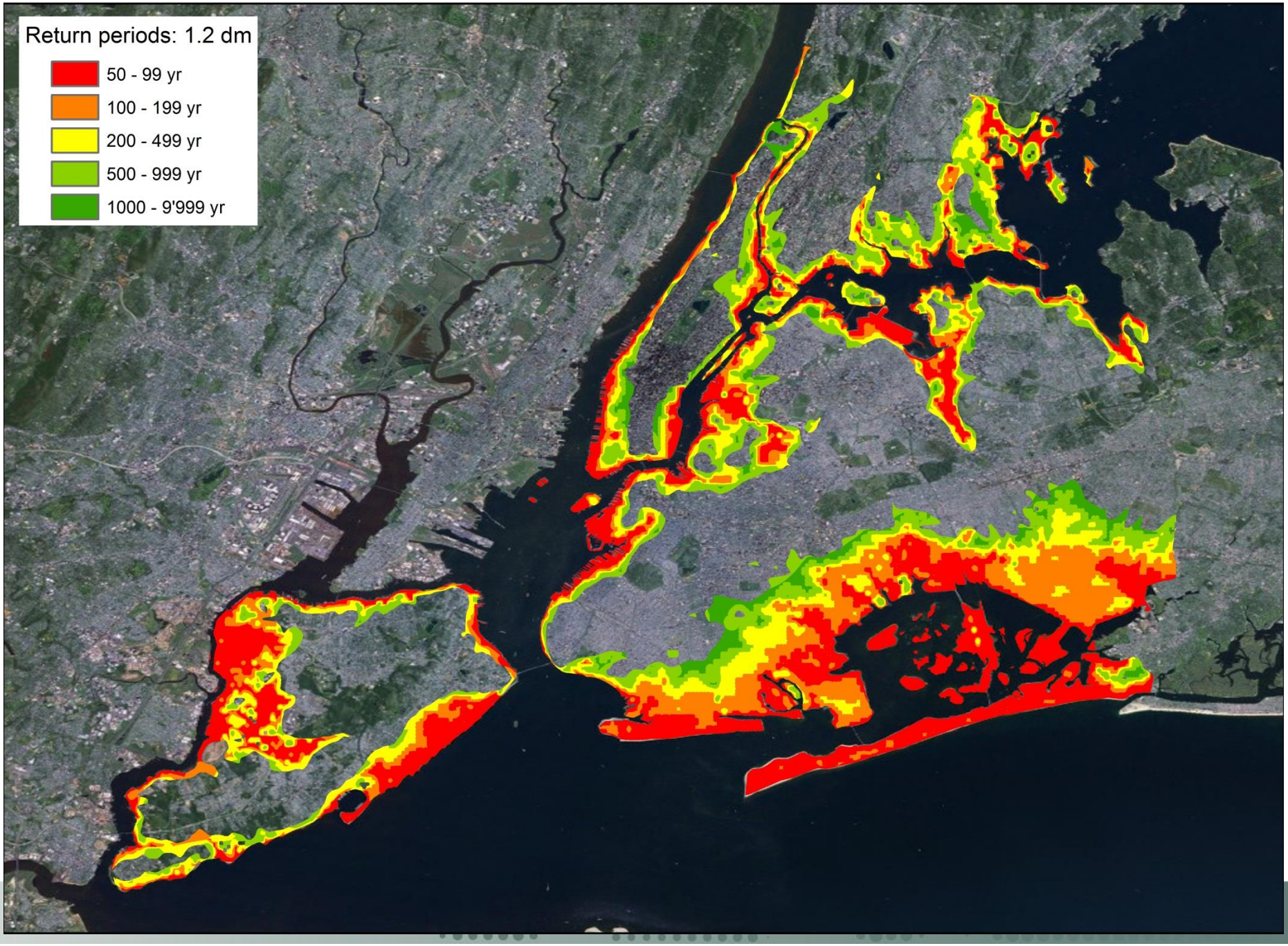
Swiss Re

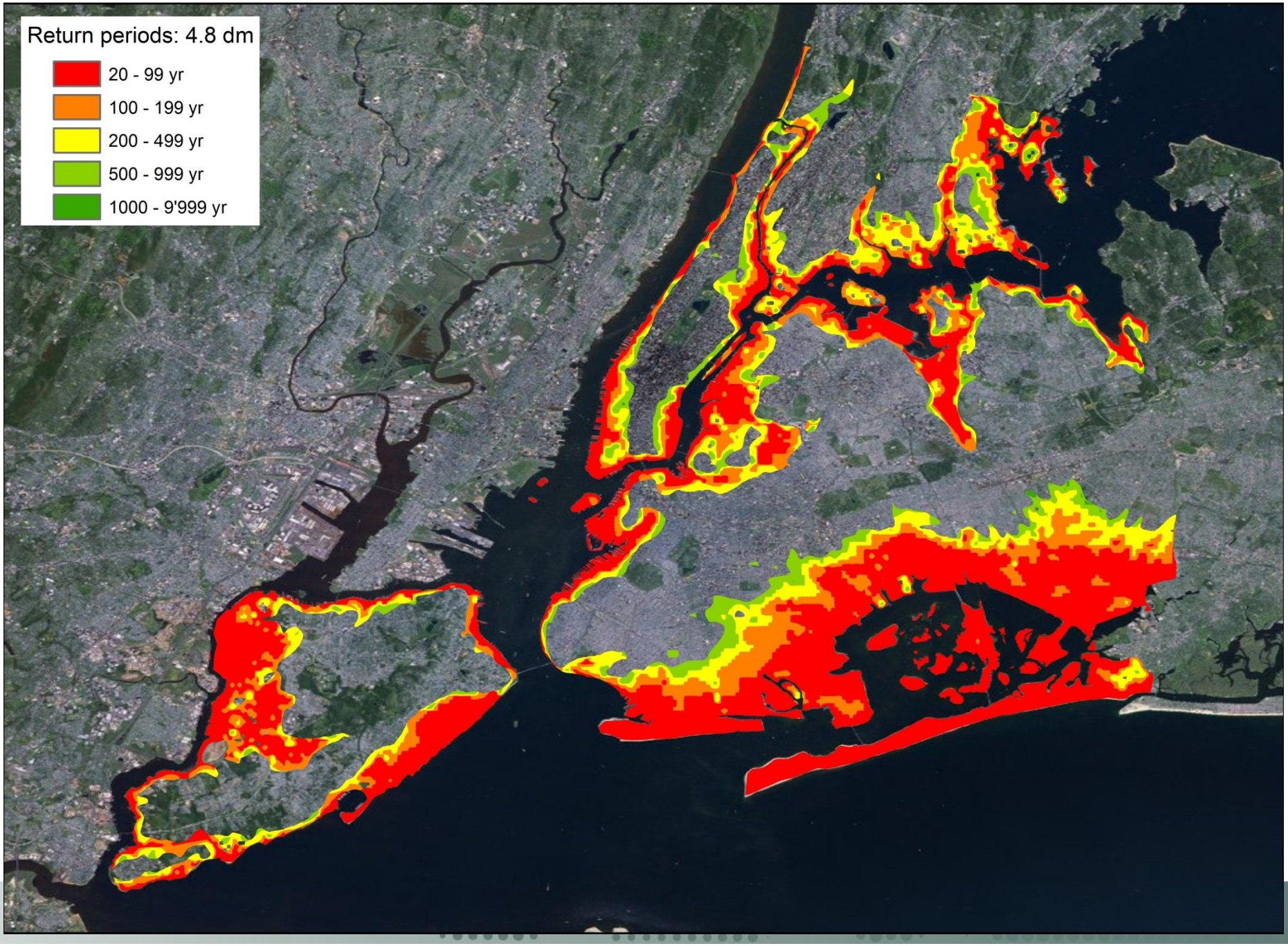


Modeled insured losses reached or exceeded with 10" sea level rise versus current levels

Source: Swiss Re report on Natural Catastrophes and Man-Made Disasters in 2012.
http://media.swissre.com/documents/sigma2_2013_EN.pdf


Return periods: current
50 - 99 yr
100 - 199 yr
200 - 499 yr
500 - 999 yr
1000 - 9'999 yr


Return periods: 1.2 dm
50 - 99 yr
100 - 199 yr
200 - 499 yr
500 - 999 yr
1000 - 9'999 yr


Return periods: 4.8 dm
20 - 99 yr
100 - 199 yr
200 - 499 yr
500 - 999 yr
1000 - 9'999 yr

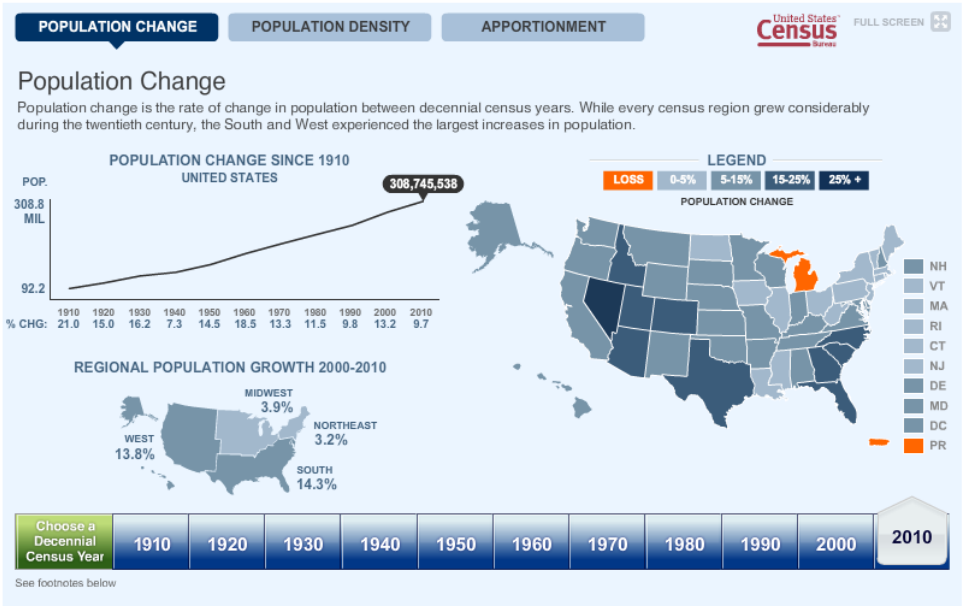
Swiss Re

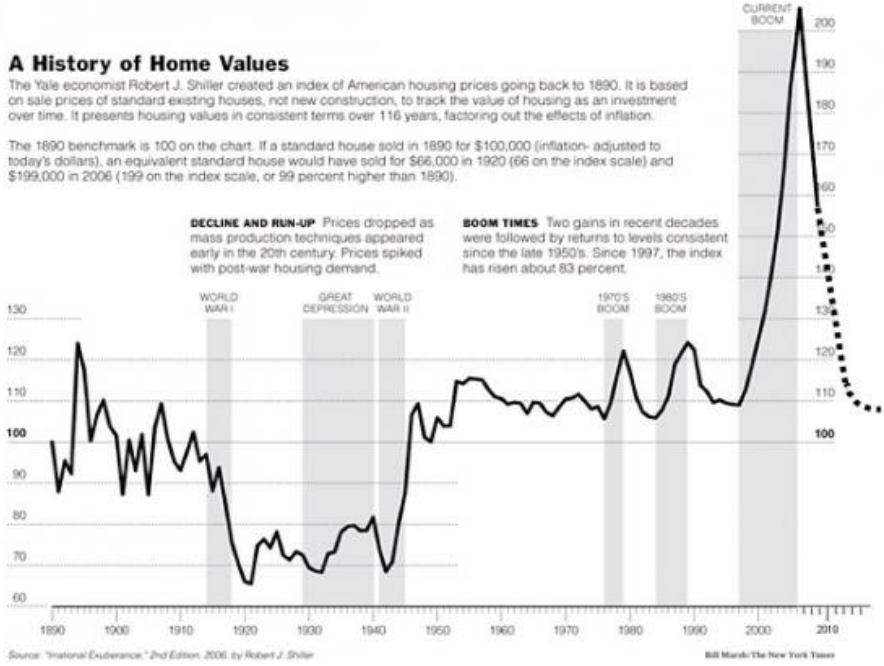
Disaster by Design

The changing face of natural catastrophes

The Real Culprits: Population, Wealth Technology, Globalization, and Competition

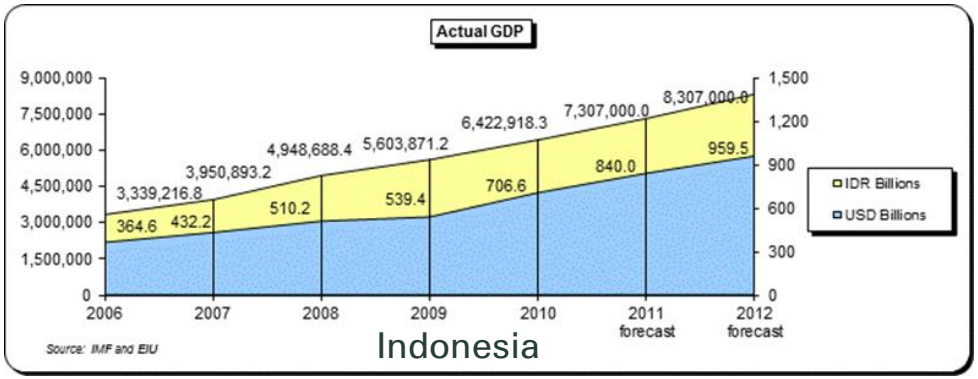
Swiss Re





Industry

Then and Now

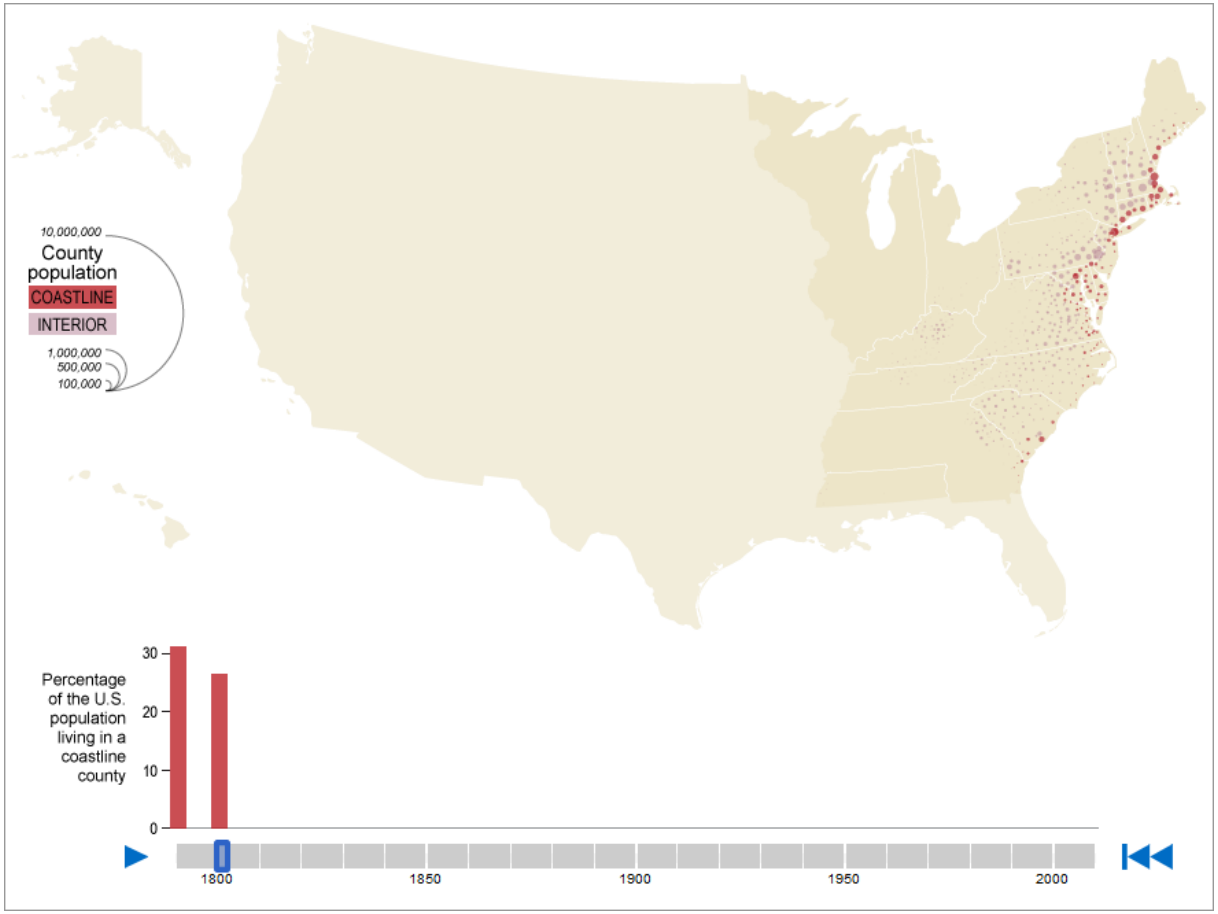


Globalization brings wealth in emerging markets

Swiss Re

Coastal Population Growth

1800

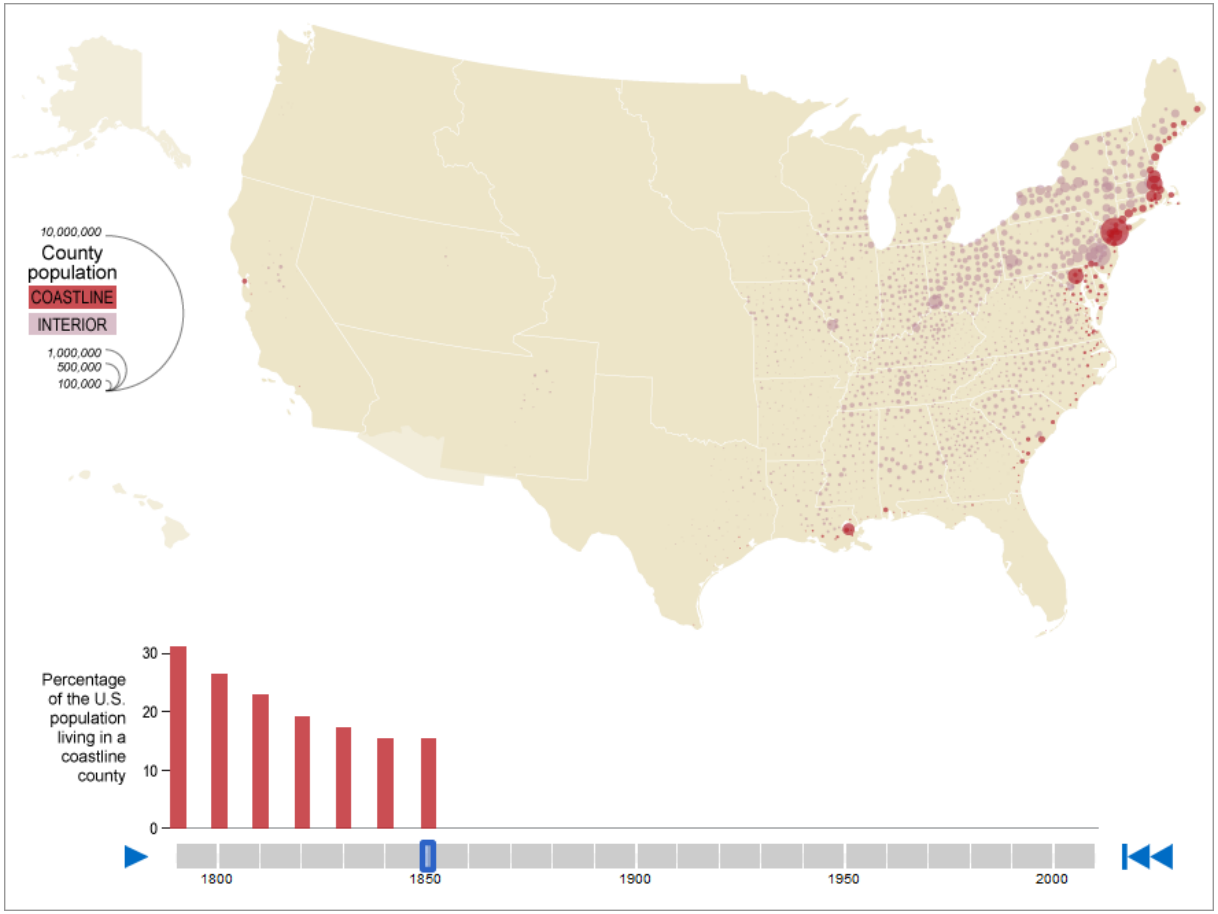


Source: U.S Census Bureau

Swiss Re

Coastal Population Growth

1850

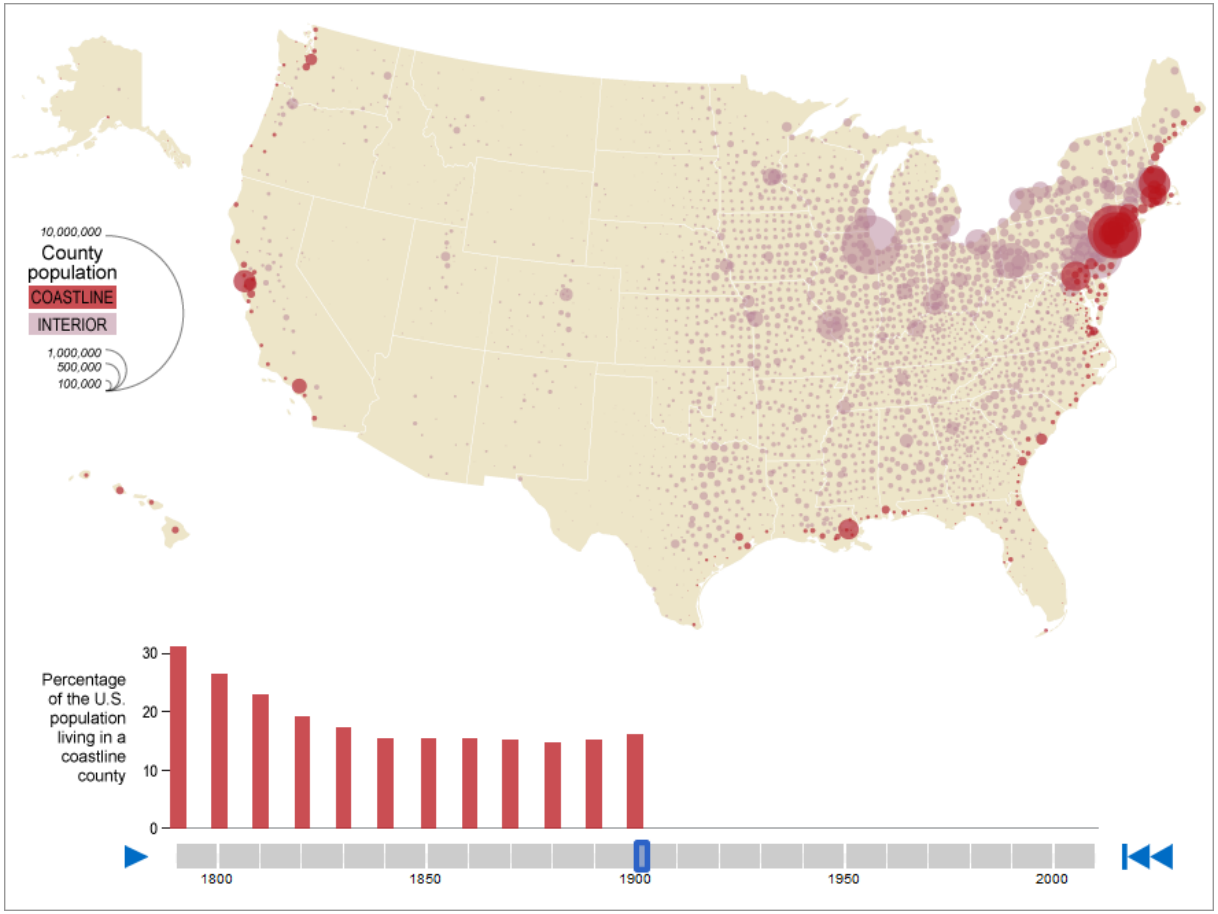


Source: U.S Census Bureau

Swiss Re

Coastal Population Growth

1900

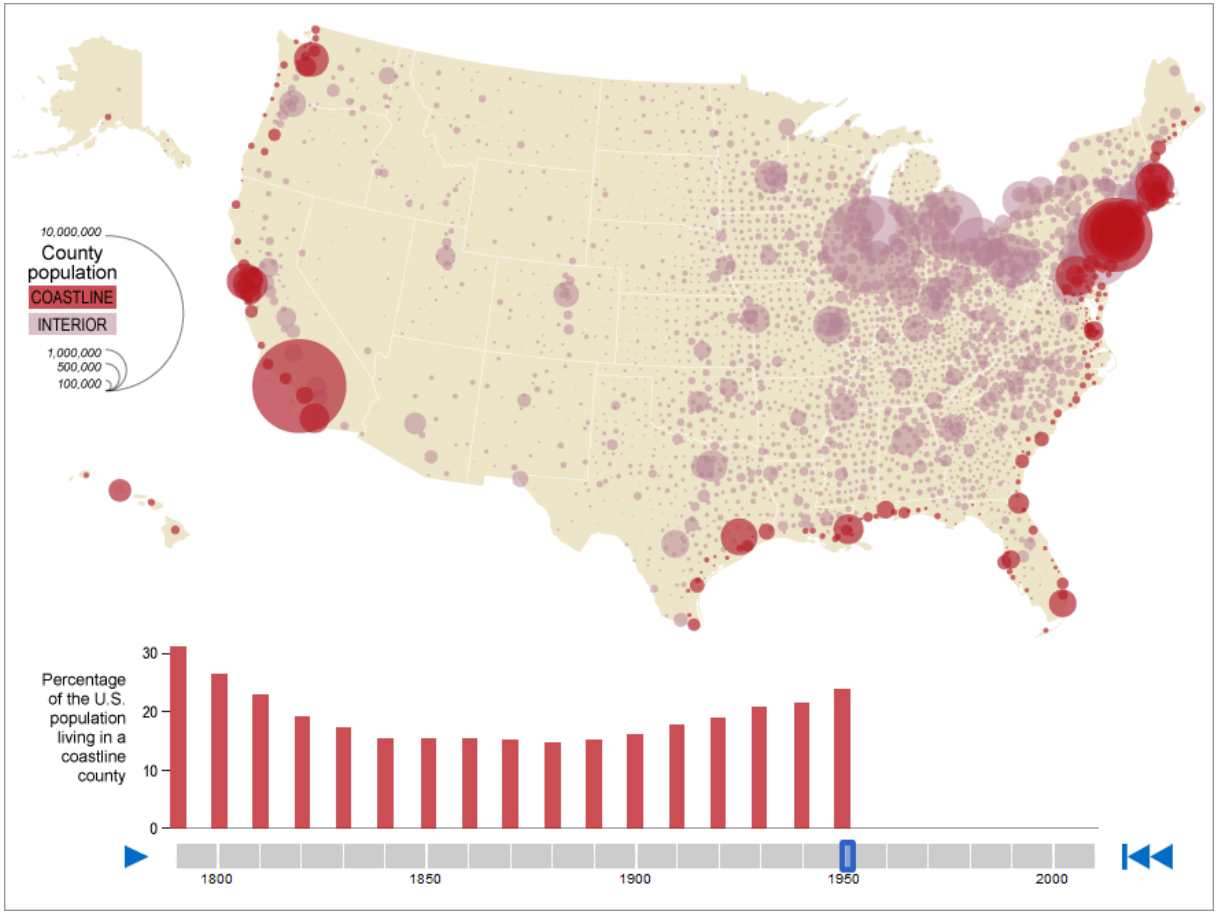


Source: U.S Census Bureau

Swiss Re

Coastal Population Growth

1950

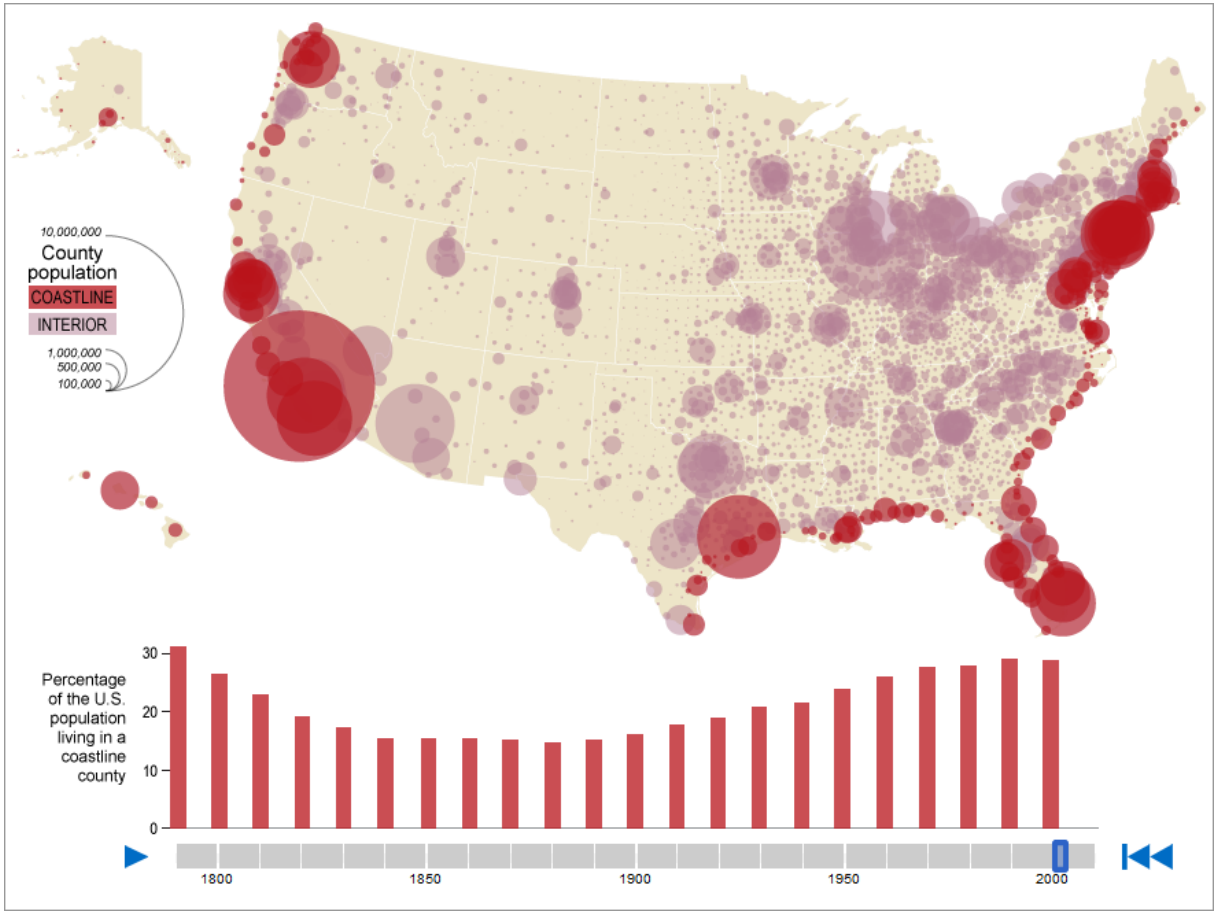


Source: U.S Census Bureau

Swiss Re

Coastal Population Growth

2000

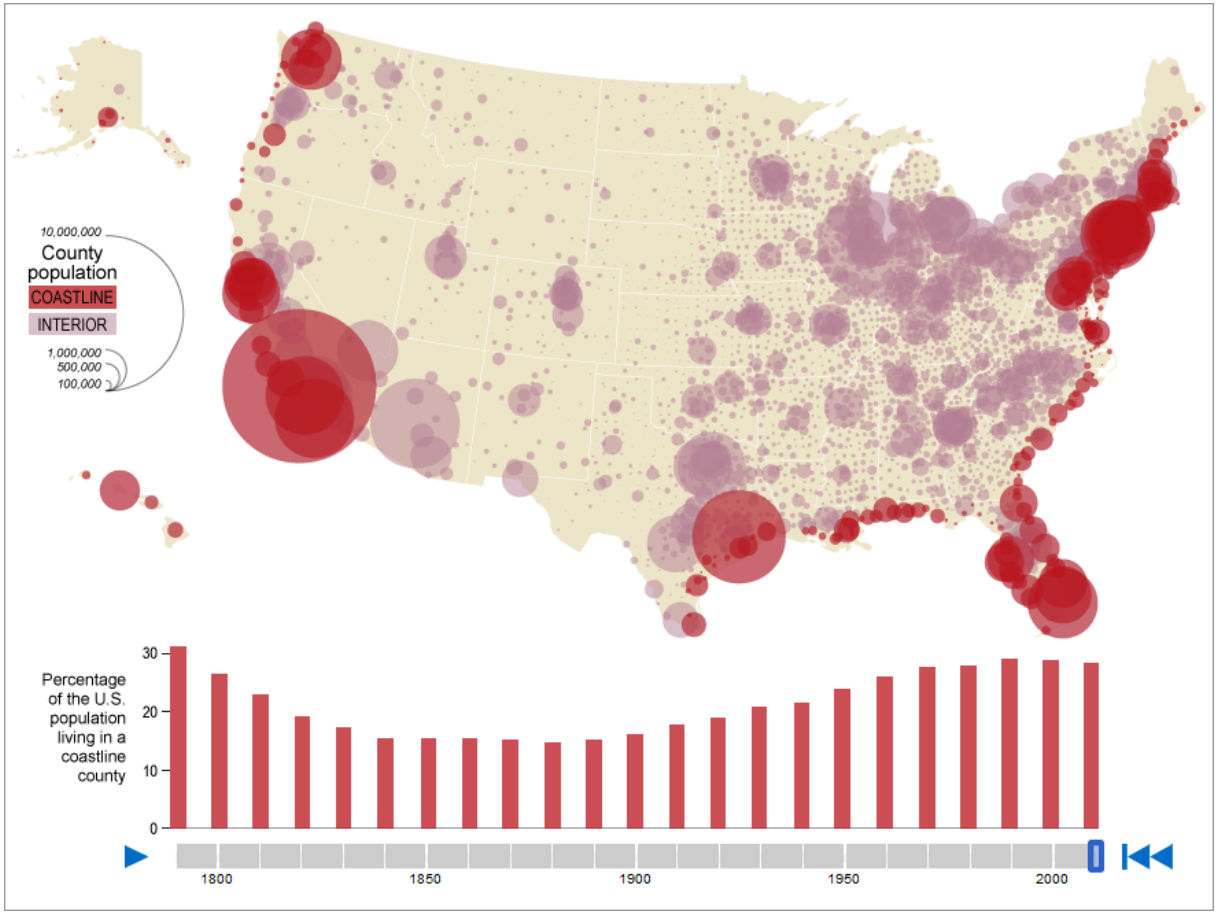


Source: U.S Census Bureau

Swiss Re

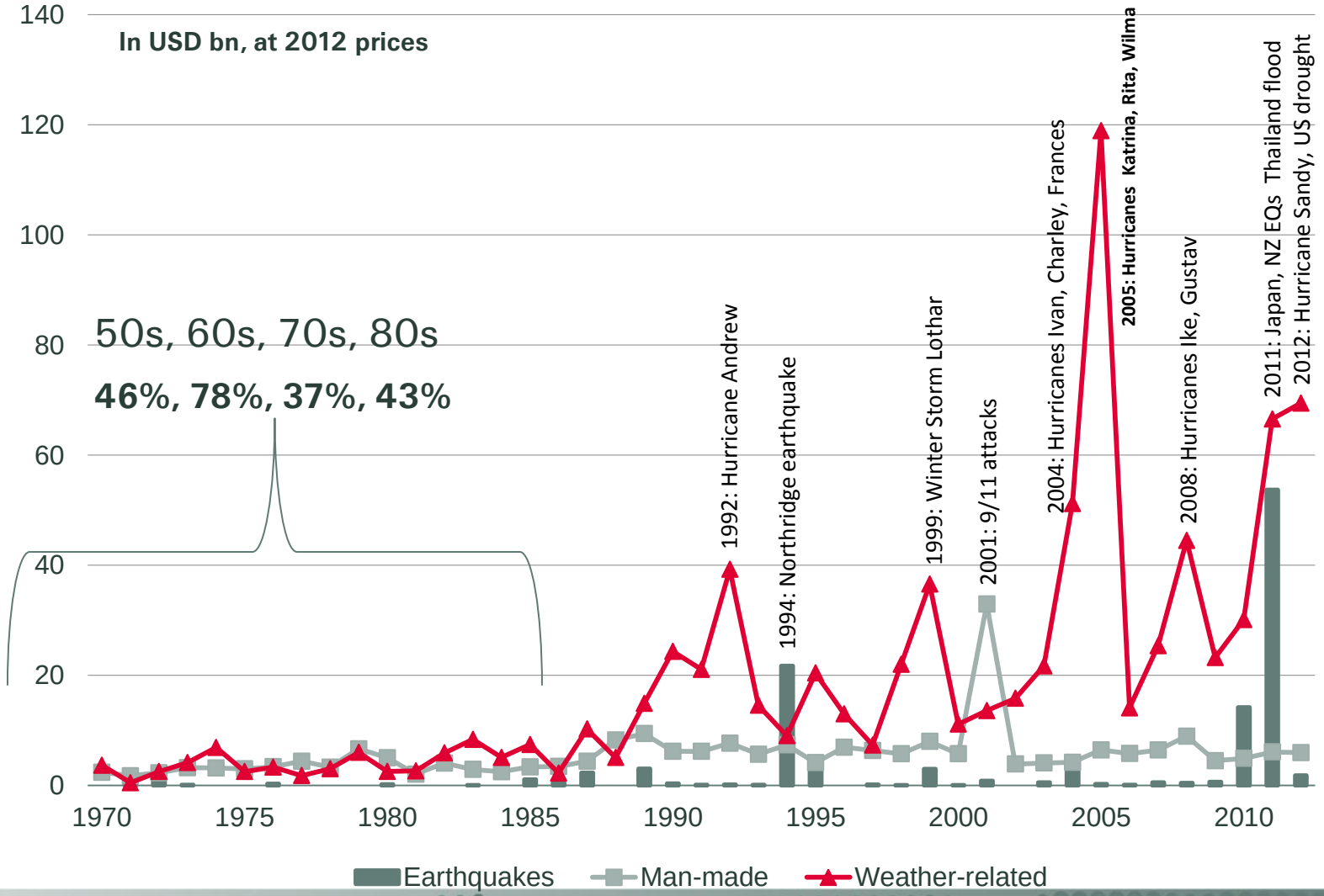
Coastal Population Growth

2010



Source: U.S Census Bureau

Trend in losses moving upwards



Size of Homes
and Location, Location, Location

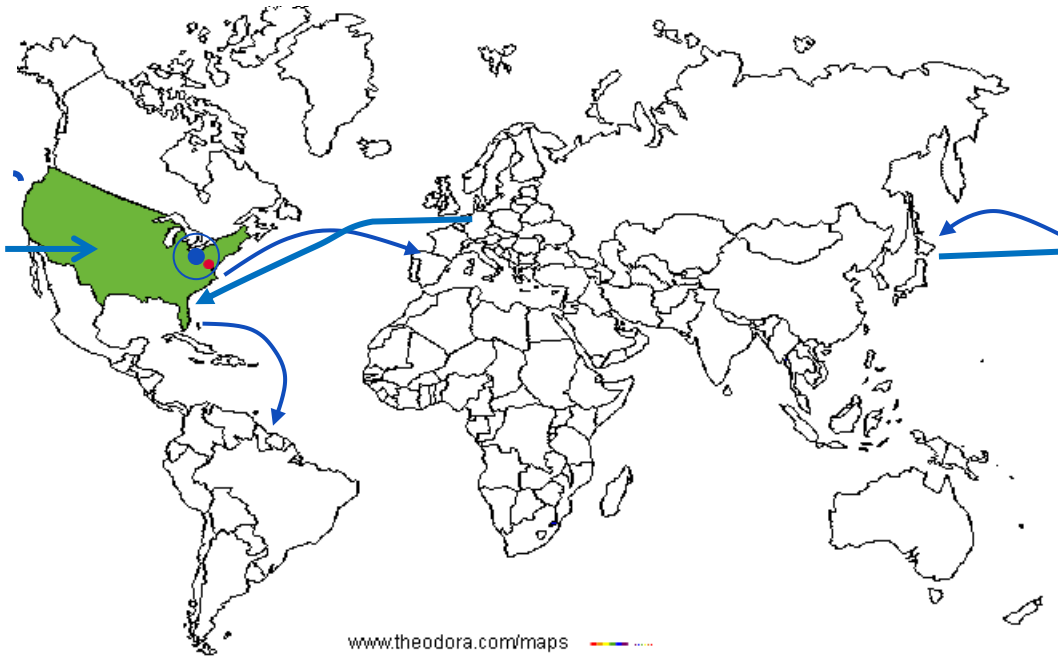
Swiss Re

Source: www.villagepftikiisland.org

Looking 50 years back at industry

Swiss Re

Source: California Historical Society



- Labor driven (resilient, strikes, expensive)
- Low technology & heavy machinery
- Capital Intensive
- Warehousing of 3 months inventory

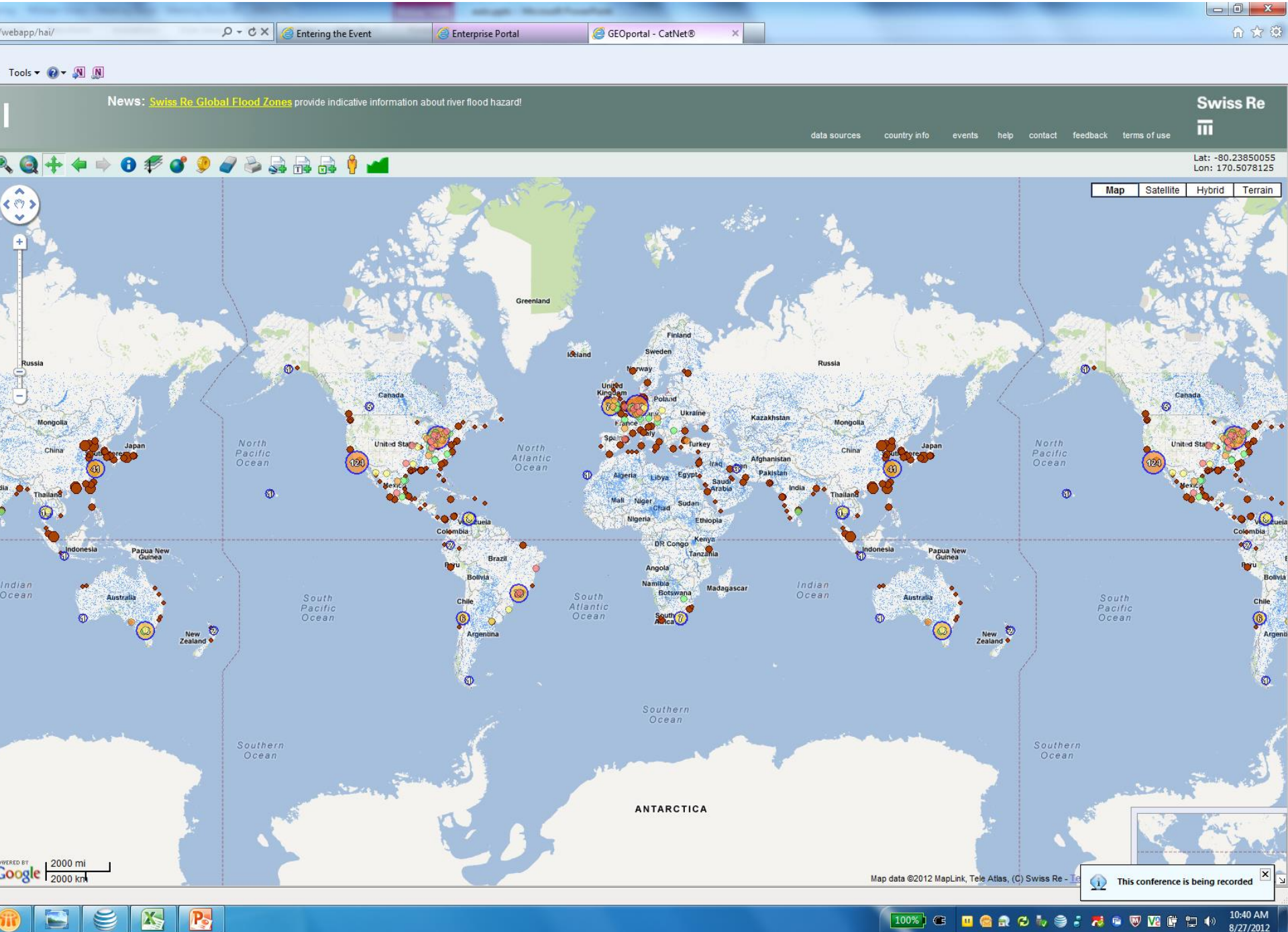
- Local market some exporting
- Shipping by rail
- Self sufficient using local suppliers
- Limited competition from abroad
- Local captive market

Today

Swiss Re

- Global competition requires change
- International economics dictates outsourcing to least costly regions
- JIT delivery replaces warehousing
- Mergers and acquisitions
- Clustering of suppliers near industry
- Expensive High Tech replaces old M&E

- Emerging markets become consumers
- Local mfg. to support local market
- Specialized foreign low cost suppliers
- Exporting requires access to terminal s
- High coordination of supply chain becomes paramount


/webapp/hai/
Entering the Event
Enterprise Portal
GEOportal - CatNet®
Tools
News: Swiss Re Global Flood Zones provide indicative information about river flood hazard!
Swiss Re
data sources
country info
events
help
contact
feedback
terms of use
Lat: -80.23850055
Lon: 170.5078125
Map
Satellite
Hybrid
Terrain
Greenland
Iceland
Finland
Sweden
Norway
Russia
Canada
United States
Mexico
Mongolia
China
Japan
Kazakhstan
Ukraine
Poland
France
Spain
Italy
Turkey
Iraq
Afghanistan
Pakistan
India
Thailand
Indonesia
Papua New Guinea
Australia
New Zealand
Algeria
Libya
Egypt
Saudi Arabia
Mali
Niger
Chad
Sudan
Nigeria
Ethiopia
Kenya
Tanzania
DR Congo
Angola
Namibia
Botswana
Madagascar
South Africa
Colombia
Venezuela
Brazil
Peru
Bolivia
Chile
Argentina
North Pacific Ocean
North Atlantic Ocean
South Pacific Ocean
South Atlantic Ocean
Indian Ocean
Southern Ocean
ANTARCTICA
2000 mi
2000 km
Map data ©2012 MapLink, Tele Atlas, (C) Swiss Re
This conference is being recorded
100%
10:40 AM
8/27/2012

Swiss Re

The World is Getting Smaller while the Risk is Getting Bigger

The successful industry in todays global economy must be able to manage large and complex supply chains spanning many geographic regions and be able to take advantage of opportunities across many different markets. Cost competition increasingly drives industry towards a global presence. But all these changes increase risk.

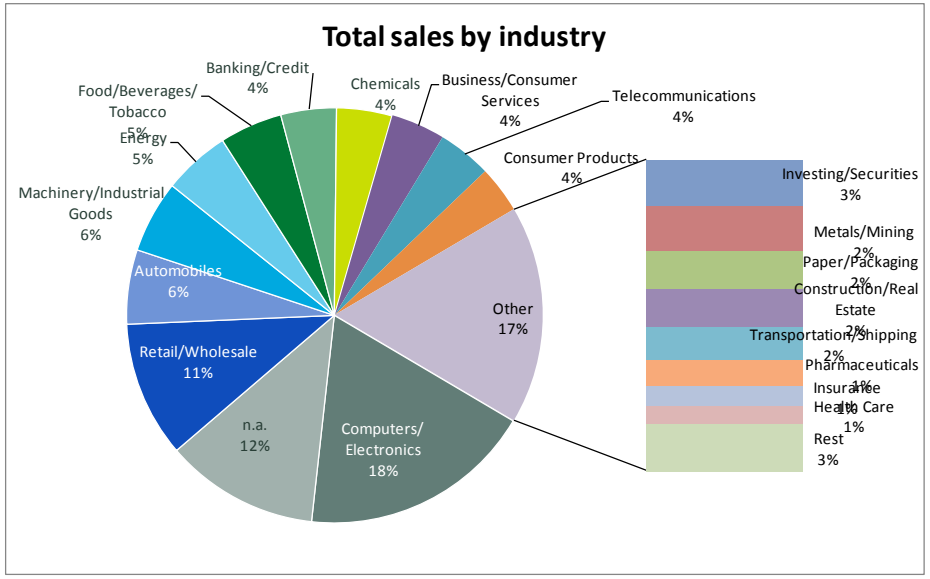
Labor to technology shift		Technology more effient but more vulnerable
Low to High Technology		Low tech easy to repair, high tech extremely vulnerable
Outsourcing to low cost region		Additional nat cat exposure (location and shipping)
Clustering of suppliers		Concentration of risk
Specialization		Concentrration of risk
Emerging markets production		Little known by extreme high hazards
Globalization		Greater chance of event
JIT Delivery		No inventory to buffer supply disruptions
Ocean Shipping		Port facilities add new threat
Expansion of global supplies		High hazad and difficult to control

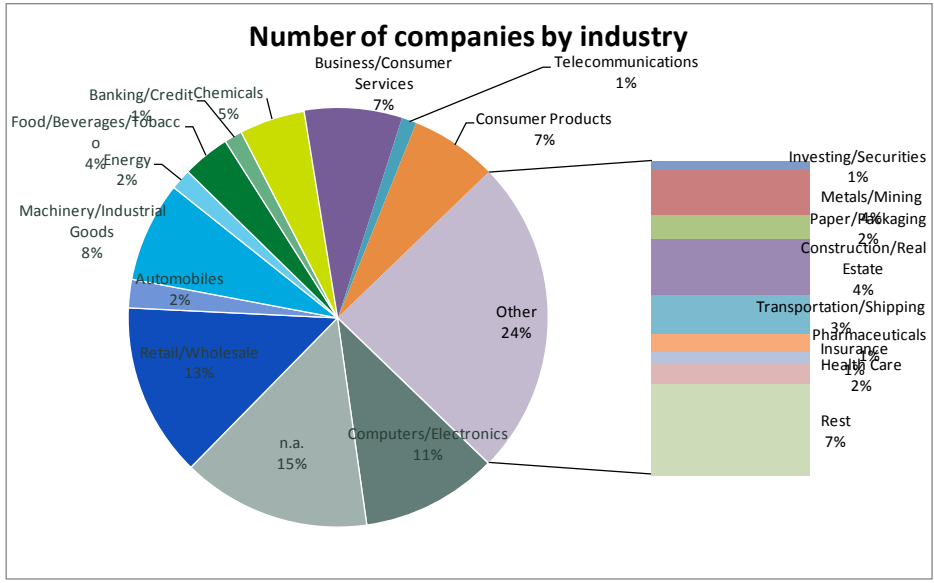
Top 20 Countries by number of foreign controlled subsidiaries

Rank	Country	Sample Size	Sample Size Sales	Total Sales, USDm	% Total Sampl	Average Size of Firm, USDm	Rank hotspot indicator	difference rank hotspot-number of companies
1	China	11154	10606	1 173 899.45	35.0%	111	1	0
2	Mexico	3747	1840	442 496.78	11.8%	240	9	7
3	Poland	3611	3421	197 464.76	11.3%	58	17	14
4	Brazil	2550	1549	311 148.78	8.0%	201	3	-1
5	Malaysia	1920	1730	197 181.58	6.0%	114	20	15
6	Russia	1675	1643	149 519.43	5.3%	91	4	-2
7	Indonesia	1495	353	96 398.19	4.7%	273	15	8
8	Argentina	1198	723	107 651.97	3.8%	149	8	0
9	Thailand	990	210	21 622.12	3.1%	103	7	-2
10	India	910	703	99 095.87	2.9%	141	2	-8
11	Turkey	834	486	121 817.68	2.6%	251	13	2
12	UAE	553	73	20 043.80	1.7%	275	16	4
13	Colombia	490	412	54 813.04	1.5%	133	12	-1
14	Vietnam	319	151	19 273.59	1.0%	128	10	-4
15	Egypt	162	41	2 526.15	0.5%	62	18	3
16	Saudi Arabia	118	11	182.33	0.4%	17	11	-5
17	Nigeria	76	9	535.36	0.2%	59	14	-3
18	Kazakhstan	36	6	3 955.94	0.1%	659	6	-12
19	Azerbaijan	12	1	0.93	0.0%	1	5	-14
	Grand Total	**31850**	**23968**	**3 019 627.75**				

Key industries of foreign controlled parents

- Computers/electronics most dominant, followed by retail, automobile and machinery and industrial goods
- Food, chemicals, consumer goods less important, but substantial share





Business interruption, the silent killer

Swiss Re

Company	Industry	Estimated Loss (USD millions)	Type of Loss
Grupo Arauco	Pulp Producer, Plywood Manufacturer and Saw Mill.	400 to 600	Approximately 65% of the loss is from business interruption
Grupo Quinienco	Brewery, Winery and Manufacturing	300	60% from business interruption
Cintra	Infrastructure - Highway	200	Primarily physical damage
CMPC	Pulp and Paper Manufacturer	170	60% from business interruption
D&S (WalMart Chile)	Retail Stores	150	Primarily physical damage
ENAP	Oil and Gas	150	Evenly distributed between physical damage and business interruption
CAP	Steel Mill (Huachipato Plant)	140	60% from business interruption
Empresas Portuarias de Chile	Ports	140	Primarily physical damage
Viña Concha y Toro	Winery	110	Evenly distributed between physical damage and business interruption

(Aon Benfield)

2010/05/12

- Roughly half of the total insurance payout to industrial facilities in Chile was made for business interruption (BI) claims.
- Proper allocation of BI sum insured is vital. Damage of key infrastructure may lead to full BI loss (e.g. loading port of a mine).

- Earthquake models may underestimate the BI potential of certain industry groups.
- Proper allocation of BI sum insured is vital.

Swiss Re

Are we keeping up?

Fire Losses vs. Hurricanes

Swiss Re

Year	# of TC	Loss
1970	1	$ 454,000,0
1971	4	$ 212,580,0
1972	3	$ 2,101,780,0
1973	1	$ 18,000,0
1974	2	$ 160,000,0
1975	1	$ 490,000,0
1976	1	$ 100,000,0
1977	1	$ 10,000,0
1978	1	$ 20,000,0
1979	6	$ 3,050,000,0
1980	1	$ 300,000,0
1981	1	$ 25,000,0
1982	2	$ 12,000,0
1983	1	$ 2,000,000,0
1984	2	$ 66,000,0
1985	7	$ 4,020,000,0
1986	2	$ 17,000,0
1987	2	$ 7,900,0
1988	5	$ 59,420,0
1989	4	$ 7,670,000,0
1990	1	$ 57,000,0
1991	1	$ 1,500,000,0
1992	2	$ 25,000,000,0
1993	2	$ 57,000,0
1994	3	$ 973,000,0
1995	6	$ 3,742,800,0
1996	3	$ 3,600,000,0
1997	1	$ 100,000,0
1998	7	$ 3,699,000,0
1999	5	$ 5,532,000,0
2000	2	$ 26,800,0
2001	3	$ 5,260,000,0
2002	6	$ 1,219,600,0
2003	3	$ 3,600,000,0
2004	7	$ 43,834,000,0
2005	6	$114,220,000,0
2006	1	$ 500,000,0
2007	1	$ 50,000,0
2008	5	$ 25,370,000,0
2009	0	$ -
2010	3	$ 268,000,0
2011	1	$ 7,000,000,0
2012	2	$ 52,350,000,0

Year	Fires	Civilian deaths	Civilian injuries	Direct property damage (In billions) As reported
1977	723,500	5,865	21,640	$2.00
1978	706,500	6,015	20,400	$2.10
1979	696,500	5,500	18,825	$2.40
1980	734,000	5,200	19,700	$2.80
1981	711,000	5,400	19,125	$3.10
1982	654,500	4,820	20,450	$3.10
1983	625,500	4,670	20,750	$3.20
1984	605,500	4,075	18,750	$3.40
1985	606,000	4,885	19,175	$3.70
1986	565,500	4,655	18,575	$3.50
1987	536,500	4,570	19,965	$3.60
1988	538,500	4,955	22,075	$3.90
1989	498,500	4,335	20,275	$3.90
1990	454,500	4,050	20,225	$4.20
1991	464,500	3,500	21,275	$5.51
1992	459,000	3,705	21,100	$3.80
1993	458,000	3,720	22,000	$4.82
1994	438,000	3,425	19,475	$4.20
1995	414,000	3,640	18,650	$4.30
1996	417,000	4,035	18,875	$4.90
1997	395,500	3,360	17,300	$4.50
1998	369,500	3,220	16,800	$4.30
1999	371,000	2,895	16,050	$5.00
2000	368,000	3,420	16,975	$5.50
2001	383,500	3,110	15,200	$5.50
2002	389,000	2,670	13,650	$5.90
2003	388,500	3,145	13,650	$5.93
2004	395,500	3,190	13,700	$5.80
2005	381,000	3,030	13,300	$6.70
2006	396,000	2,580	12,500	$6.80
2007	399,000	2,865	13,600	$7.44
2008	386,500	2,755	13,160	$8.20
2009	362,500	2,565	12,650	$7.60
2010	369,500	2,640	13,350	$6.90
2011	370,000	2,520	13,910	$6.90

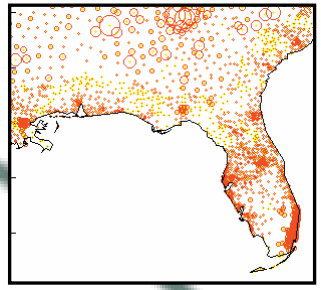
Basic Cat Modeling Methodology
The four box model approach

Swiss Re

Hazard

Where, how often and how strong?

Value Distribution



Where, what and characteristics?

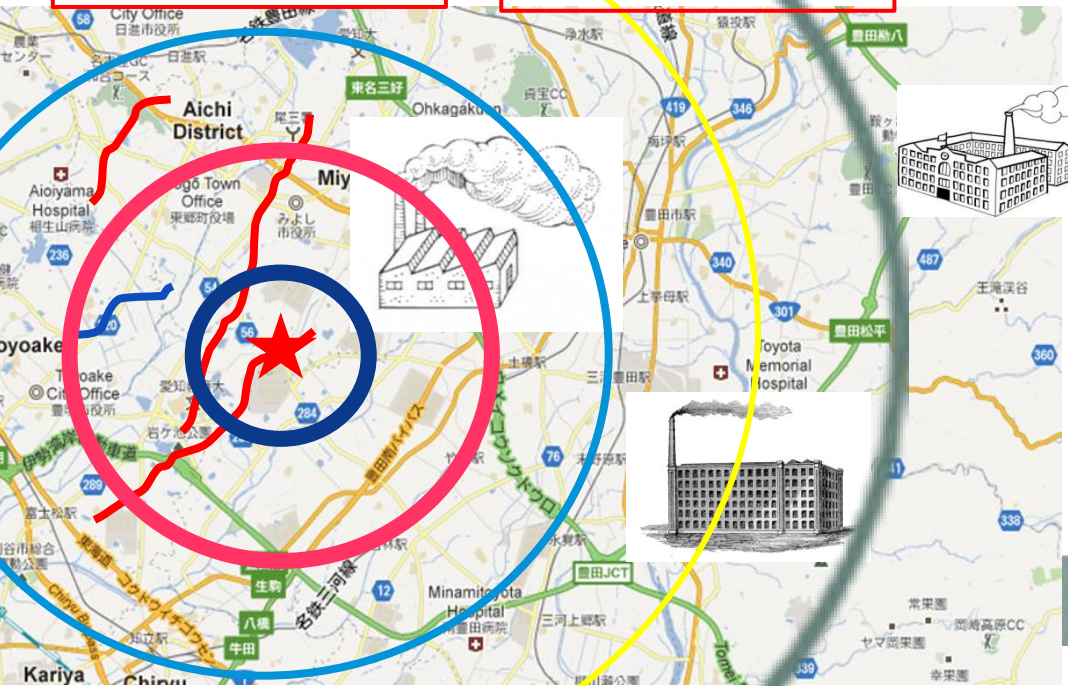
Vulnerability

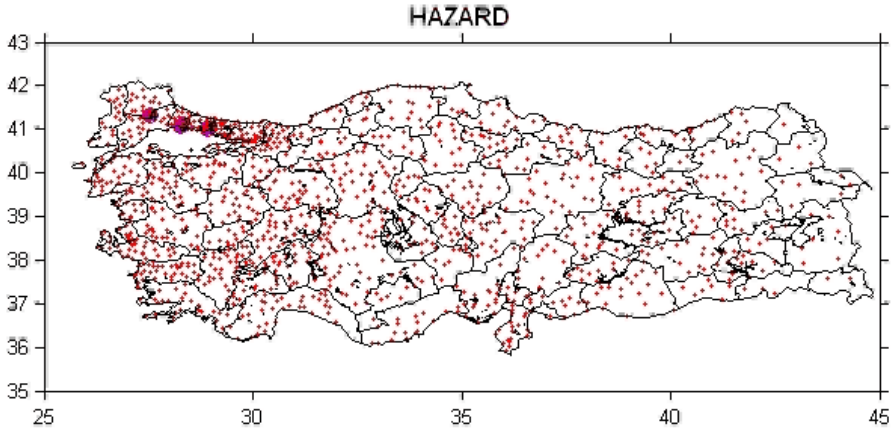
What damage degree?

Financial

- Deductibles
- Covers
- Shares
- Exclusions
- ...

What is covered?




HAZARD
43
42
41
40
39
38
37
36
35
25
30
35
40
45


Swiss Re
Thank you
SWISS RE
150
YEARS