

# Natur- und Geisteswissenschaften Drei Fallbeispiele

- 1. Das Tohoku-Erdbeben*
- 2. Mesopotamien in 2. Jahrtausend v.Chr.*
- (3. Genetik und Linguistik)*

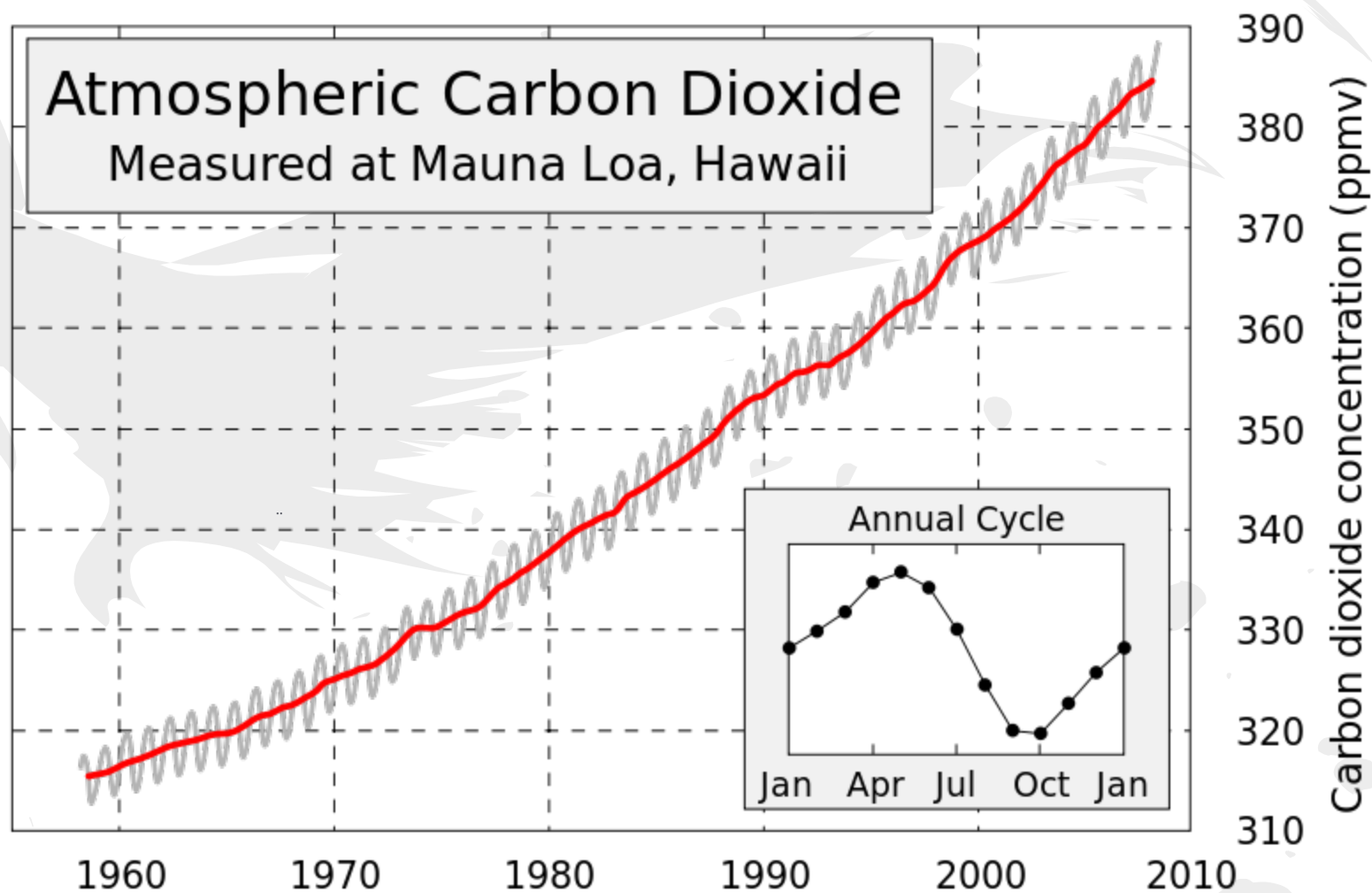
# Being Prepared for Global Warming

- 1. Quantum Computation (Jena talk)*
- 2. Dresden ?*

# Arbeitskreis Energie der DPG

- inclusive (industry, research, environment)
- active (exemplary: Munich Re)
- controversial, but rational discussions
- in line with international views  
(e.g. Steven Chu, US Secretary of Energy)
- almost completely useless

# Atmospheric Carbon Dioxide Measured at Mauna Loa, Hawaii



# DESERTEC

In 2012, Bosch and Siemens announced that they are leaving the consortium.

Reuters, 12.11.2012:  
The upheaval of the Arab Spring  
...has added to the doubts.

Is this a correct appreciation of the risks?

What is the probability that an important study of risks gets disastrously wrong results?

*A question not for science only.*

# Rasmussen Report (WASH-1400, Reactor Safety Study, 1975)

## Section 5.4.6

"Some plants are located on the sea shore where the possibility of tidal waves, and waves and high water levels due to hurricanes exist. The plant design in these cases must accommodate the largest waves and water levels that can be expected. Such events were assessed to represent negligible risks."

# 2011 Tohoku earthquake

cost estimate by World Bank:  
235 billion US \$.

Japan was fairly well prepared for similar earthquakes southwest of Tokyo, but not for such a quake in the Sendai region. But the quake was not a surprise for everyone.



# **The 869 Jogan tsunami deposit and recurrence interval of large-scale tsunami on the Pacific coast of northeast Japan,**

K. Minoura et al., JNDS 23 (**2001**) 83-88.

Citation from Sandai-jitsuroku: ".. Sometime after severe seismic shocks, a gigantic tsunami reached the coast and invaded entire Sendai plain. Rising seawater flooded an old castle town, causing the loss of 1000 lives."

castle town = Tagajo, 4 km inland.

Board of education, Tagajo city, **2000**: "The committee studying the remains considers that exposed structures in the castle town collapsed owing to erosion by the Jogan tsunami."



869 AD  
2011 AD

*A change of language:*

Vermeidung des Klimawandels → Anpassung

'Resilience':

Relocation of cities,  
better protection against flooding and wind,  
...

Major uncertainties: agriculture and disease

# Drought 2012:

(Latest estimate by US Department of Agriculture)

U.S. 2012 corn production is now estimated at 10.7 billion bushels, down sharply from early-season projections of 14.8 billion.

# Troubling times

The risks of harvest failures and infectious diseases are hard to judge, but seem to be substantial.

History provides several examples of severe effects on human society, in particular around 2100 BC, 1600 BC, 1200 BC, 1350 AD.

*1350, Limburger Chronik, Tileman Elhen:*

Item darnach ober ein jar, da dit sterben,  
dise geiselerfart, romerfart und judenslacht .. ein  
ende hatte, da hup die wernt wider an zu leben  
unde frolich zu sin, unde machten die menner  
nuwe kleidunge ... und die frauwen drugen wide  
heubtfenster, also daz man ire broste binach  
halbe sach.

*1395:*

Unde der grossen pestelencien han ich vir  
gesehen unde irlebet.

Tileman Elhen describes a very resilient town, initially one of citizens of high self-confidence, very capable to deal with the feudal powers, a valued junior partner of Frankfurt. Limburger Str.

People adapted in switching from wheat to barley, to stricter rules in agriculture (Dreifelderwirtschaft), to a greatly reduced population.

At the end of the chronicle one sees successful survivors, but there is a broken spirit, resigned to a subjugated life in a repressive state.

## *How to recognize climate problems*

Climate crises cause simultaneous long lasting problems for distant populations.

The decades marked by the plague were equally devastating in Europe, the Middle East, and China.



# More examples?

Dark ages in:

*Egypt*

*Mesopotamia*

Old empire	... Akkadian empire
Middle empire	Old Babylonian and Assyrian states
New empire 1200 bc	Middle Babylonian and Assyrian states
Late period	Neo Assyrian state

# Crisis 1200 b.c.

Greece: Trojan war, then collapse for 400 years.

Egypt + Hittite empire: plague, famine,  
peace treaty (celebrated by UN), grain shipments  
from Egypt to Anatolia.

Hittite empire collapses. Egypt absorbs migrants  
(e.g. Libyan pharaohs), but becomes 'a shaky reed'.

Assyria: collapse of great agricultural project,  
brutal war against migrants. Rebirth as military state.

Babylonia: chaos.

# Dating problems for the previous crisis

The crisis struck during the later Hammurabi dynasty.

Choices for the first year of Hammurabi:

1848 bc

1792 bc (variant 1784 bc)

1728 bc

1696 bc.

Apart from the last alternative, all based on Venus observations.



1784 bc is correct.

Long period of invisibility of Venus in 1627 bc and lack of observations in 1626 bc matches with tree ring records of volcanic event in 1628/27 bc (biggest in 2nd millenium bc).

Solar eclipse record in Assyrian chronicle 48 years before Hammurabi matches 1832 bc total eclipse.



upper edge

KEL G = Kt.01/k 287 obverse

Crisis 1700 - 1550 bc:

1700 bc: collapse of Assyrian trade.

all cities in Southern Mesopotamia become depopulated (Babylon resettled after some decades).

Egypt: major problem with migrations (Hyksos pharaohs).

## Tentative lessons?

Plagues were of minor importance (except for collapse of Hittite empire).

Agriculture and migrants were general problems.

Change of political system almost unavoidable, but details seem unpredictable.



Many urgent problems need cooperations between researchers in the sciences and the humanities.

*Omitted part 3: new encouraging examples*

In any case, the capability to read and interpret texts and images from other cultures must be preserved and developed.

When it is under threat, scientists should get interested.

Maybe that even will help concerning DESERTEC..