

## Global climate change, war and population collapse 全球氣候變化、戰爭及人口銳減



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**Historical war-peace, population and economic cycles were induced by climate change!**

**人類歷史上的戰亂、人口及經濟循環是由氣候變化所引起的！**

**This research report will be published online in the 'Proceedings of the National Academy of Sciences of the United States of America' (one of the three most prestigious peer-reviewed journals in the world) this week. It will be officially published in the journal on December 4.**

**這份研究報告將於本星期內在《美國科學院院刊》（全球三大綜合學術期刊之一）的網頁發佈，並於十二月四日正式刊登。**



**How climate change affected human societies in the past?**

**究竟過去的氣候變化怎樣影響人類社會？**

**Scientists are much divided on this issue because no researchers can give any strong scientific evidence about it...**

**一眾科學家對於這個問題存有極大的意見分歧，因為沒有研究人員能夠提供任何有力的科學證據...**

**This research is the 1<sup>st</sup> study to give quantitative and scientific evidence about the impact of climate change on human societies in recent human history at global and continental scales.**

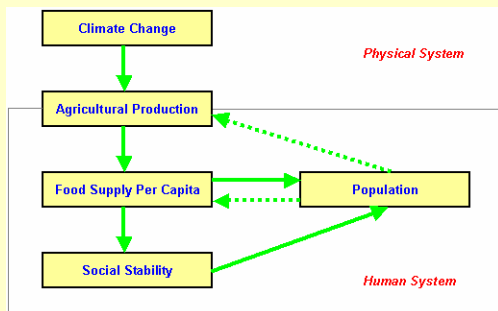
**這個研究是有史以來第一個研究，在「全球」及「大陸」尺度上，就近代人類歷史上氣候變化怎樣影響人類社會這個問題，提供定量的科學證據。**

**Why did climate change lead to socio-economic crisis in recent human history?  
為什麼在近代人類歷史當中氣候變化會造成社會經濟危機？**

**Climate change directly impeded agricultural production, which led to the reduction of food supply per capita and inflation of food prices. Famines and wars followed, resulting in population collapses.**

**氣候變化直接導致農業生產下降，人均糧食減少與及糧食價格高脹，饑荒及戰爭應運而生，最終導致人口銳減。**

### Conceptual Model 概念模型



### Research methodology 研究方法

**In the past few years, we collected many historical climate, agricultural production, economic, warfare and population data to verify the above hypothesis with time series analysis.**

**在過去數年，我們搜集了大量的歷史氣候、農業生產、經濟、戰爭及人口數據，並透過「時間序列分析」方法去驗證上述的假設。**

**Research findings 研究結果**

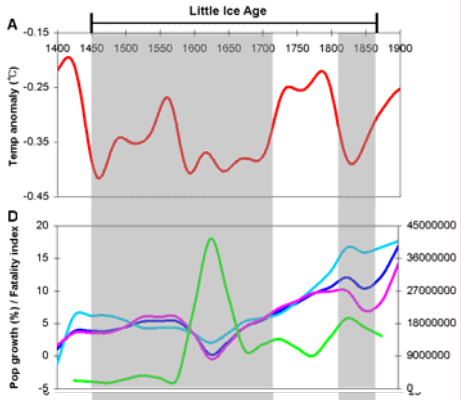
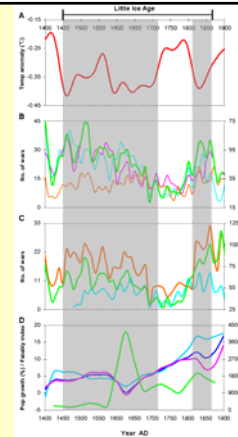
**[ POINT 1 第一點 ]**

**Cooling induced more wars around the world**

**氣候變冷令世界各地出現更多的戰爭**

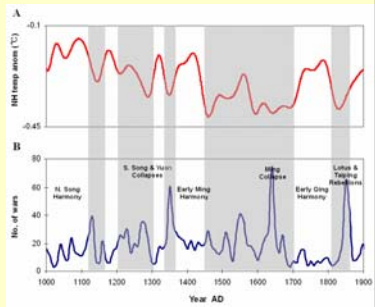
**Climate, war-peace, and population cycles in various major geographic regions around the world were closely matched.**

**世界各主要地區的氣候、戰亂及人口增長週期是極之吻合的。**



**Climate and war-peace cycles in China in the past millennium were also closely matched. Cold phases are shaded as gray strips.**

**中國過去一千年的氣候與戰亂週期也是極之吻合的。灰色直條代表氣候寒冷時期。**



- Worldwide war ratio in a cold climate was almost doubled that of a mild climate, and similar phenomenon was also observed for the Northern Hemisphere (NH), Asia, arid areas of the NH, and Europe.

在氣候寒冷時期，全球戰爭數目是氣候溫和時期的兩倍，在北半球、亞洲、北半球干旱地區與及歐洲亦有類似的發現。

- More than 80% countries and areas around the world had higher war ratios in a cold climate.

全球超過 80% 的國家及地區，在氣候寒冷時期都有較高的戰爭比率。

**Correlations between climate change and war frequency in AD 1500 – 1900**

公元 1500–1900 年氣溫變化與戰爭頻率的相關係數

These figures show that the match between cooling and war outbreak is not accidental.

\*Less than 5% is by chance;  
\*\*\*less than 0.1% is by chance

這些數據顯示氣候變冷與戰爭爆發的關連並不是出於偶然的

\*少於 5% 的機會是出於巧合；  
\*\*\*少於 0.1% 的機會是出於巧合

Regions	Correlations
World (>50,000 troops)	-0.26***
World (principal wars)	-0.32***
World (armed conflicts)	-0.36***
Northern Hemisphere (NH)	-0.46***
Southern Hemisphere	-0.48***
Asia	-0.24***
Arid areas in NH	-0.64***
Europe	-0.63***
Western Europe	-0.56***
Eastern Europe	-0.63***
North America	-0.08
South America	-0.12*
West & Central Africa	-0.49***
East & South Africa	-0.55***
China	-0.26***

**[ POINT 2 第二點 ]**

**Cooling induced population collapses around the world**

氣候變冷令多個地區出現人口銳降

In a mild climate, the population growth rates in various major geographic regions increased; in a cold climate, they shrank together.

氣候和暖時，世界各主要地區的人口增長率上升；當氣候轉冷，人口增長率隨即一同下降。

**Correlations between climate change and population growth in AD 1500 – 1900**

公元 1500 – 1900 年氣溫變化與人口增長的相關係數

These figures show that the match between cooling and population decline is not accidental.

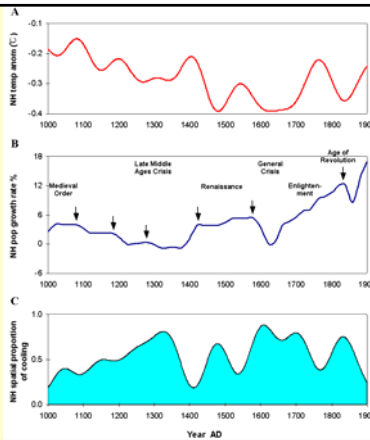
\*\*\*Less than 0.1% is by chance

這些數據顯示氣候變冷與人口增長下降的關連並不是出於偶然的  
\*\*\*少於 0.1% 的機會是出於巧合

Regions	Correlations
World	0.52***
NH	0.53***
Asia	0.59***
Europe	0.36***
North America	0.33***
China	0.57***

**Climate and population cycles in the Northern Hemisphere in the past millennium are also closely matched**

北半球過去一千年的氣候與人口週期也是極之吻合的



**[ POINT 3 第三點 ]  
Cooling engendered disastrous impact on Europe and China synchronously**

氣候變冷同時對歐洲及中國產生災難性的影響

- **We chose Europe and China (AD 1500 – 1800) to further verify the impact of climate change on human societies.**

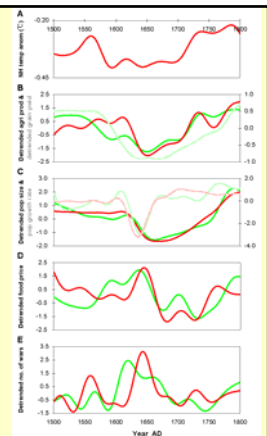
我們選擇了歐洲及中國兩個地區（公元 1500 – 1800 年）進一步驗證氣候變化對人類社會造成的衝擊。

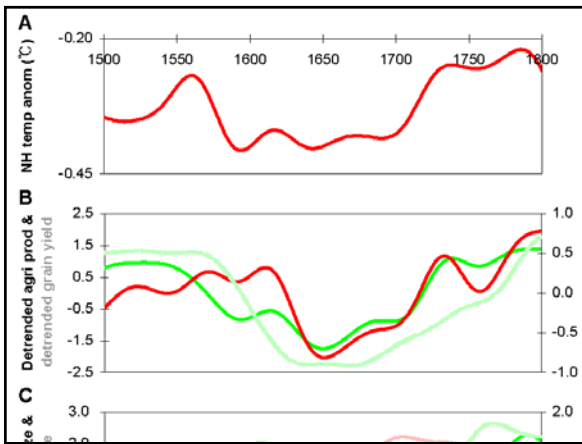
- **The two regions shared 60% of the total world population during the time.**

這兩個地區的人口合共佔了當時世界人口的 60%。

**Cooling engendered disastrous impact on Europe and China synchronously.**

氣候變冷同時對歐洲及中國產生災難性的影響





**Correlations between climate change and its impact on Europe and China in AD 1500–1800**

公元 1500–1800 年氣候變化對歐洲及中國社會的影響的相關係數

These figures confirm that climate change engendered the same socio-economic impact on the two regions synchronously.

\*\*\*Less than 0.1% is by chance

這些數據確定了氣候變化同時對兩個地區的社會經濟產生同樣的影響  
\*\*\*少於 0.1% 的機會是出於巧合

Pairs of relationship	Europe	China
Temperature Change & Agricultural Production	0.84***	0.70***
Agricultural Production & Food Supply Per Capita	-0.41***	-0.13***
Food Supply Per Capita & Population Growth	-0.32***	-0.64***
Food Supply Per Capita & War Frequency	0.64***	0.46***
War Frequency & Population Growth	-0.31***	-0.66***
Population Size & Food Supply Per Capita	0.25***	0.34***
Population Growth & Agricultural Production	0.49***	0.41***

- Europe and China were politically, economically, and geographically detached during the time. However, their socio-economic fluctuations were the same in terms of their macro-trends, turning points, and oscillation magnitude.

在當時，歐洲和中國在政治、經濟、和地理上都是完全分隔的。但是，這兩個地區的社會及經濟上的波動，無論是大趨勢、轉折點甚至是波幅，都是一致的。

- Besides, those fluctuations were in a successive order and corresponded to the temperature change.

而且，這些波動都是順序，與氣溫變化互相對應。

**To conclude, historical war-peace, population and economic cycles were induced by climate change!**

總括來說，人類歷史上的戰亂、人口及經濟循環是由氣候變化所引起的！

## Implications 研究意義

### [ POINT 1 第一點 ]

Climate change may have played a more important role on human civilization than has so far been suggested.

氣候變化在人類歷史上扮演非常重要的角色，這些都是前人所忽略的。

The creditability of many well-known theories regarding historical cycles, wars, and population changes should be re-examined.

很多的歷史循環、戰爭及人口理論的可信程度需要被重新評估。

**A. Firstly, we have satisfactorily explained the parallel occurrence of socio-economic crises in widely separated regions that were in different stages of civilization, culture, and resource endowment. This cannot be achieved by other theories.**

第一，我們完滿地解釋為甚麼在多個互不相干的地區，在不同的文明進程、文化水平及資源條件下同時出現社會經濟危機，這是其他理論無法做到的。

**B. Secondly, the level of livelihood resources will shrink in some periods due to climate change. This is the root cause of human miseries (e.g., wars, famines and epidemics). This is the point overlooked by Malthus, Darwin, and many other demographers.**

第二，由於氣候變化的關係，生活資源會在某些時期出現負增長的情況，這正是導致人類悲劇（例如：戰爭、饑荒及瘟疫）的根本原因。馬爾薩斯、達爾文及其他人口學家都忽略了這一點。

**C. Thirdly, our research results have explained when, where, and why most of wars occurred. This is also the thing not achieved by other theories.**

第三，我們的研究結果能夠解釋大部份的戰爭會在何時、何地與及為甚麼會發生，這亦是其他理論無法做到的。

**[ POINT 2 第二點 ]**

**Our research findings are useful in forecasting the impact of global warming on human societies.**

我們的研究結果有助於預測全球暖化對人類社會的影響

**A. Global warming 全球暖化**

- **The 'recent global warming' and 'past cooling' are both climatic extremes. The last 10-year is the hottest period over the last two millennia.**

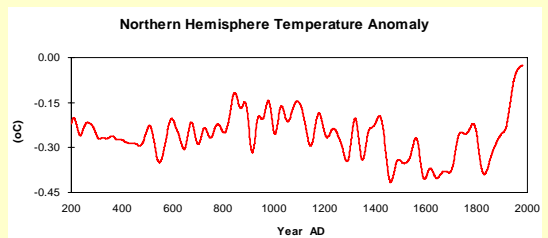
「現今的全球暖化」及「過去的寒冷氣候」都是屬於極端的氣候。過去十年是二千年來最高溫的時期。

- **The speed of global warming is totally beyond our imagination. Such abnormal climate will certainly break the balance of human ecosystem.**

全球暖化的速度遠超過我們的想像，這種反常的氣候足以破壞人類生態系統的平衡。

**Trend of global climate change**

**全球氣候變化趨勢**



## B. Possible consequences in human societies

### 人類社會有可能會出現的問題

- **At the moment, scientists cannot accurately predict the chain ecological effects induced by climate change.**

到目前為止，科學家仍然無法準確地預測氣候變化所衍生出來的生態連鎖效應。

- **If global warming continues, we are afraid that the associated shortages of livelihood resources such as fresh water, arable land, and food may trigger more armed conflicts (e.g., Darfur in Africa) or even general crises in the world.**

若果「全球暖化」持續惡化，我們恐怕一些生活資源（例如：清潔的食水、農地、糧食等等）會出現短缺的情況，這種困境有可能會釀成更多的武裝衝突（例如：非洲達庫爾），甚至全球危機。

**Thank you !**

**謝謝 !**

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