Alcune risposte a scettici e negazionisti dei cambiamenti climatici di origine antropica

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Parte I

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CENTRO EURO-MEDITERRANEO PER I CAMBIAMENTI CLIMATICI

"Tutto si spiega con la variabilità naturale del clima: la variazione dell'attività solare e le eruzioni vulcaniche."

"Gli scettici"

1850 – 2007: attività solare

Ultimi 1000 anni: la variabilità può essere spiegata con l'effetto (a corto termine) di eruzioni vulcaniche e a variazioni di riscaldamento solare.

XX secolo - inizi XXI secolo:

- **l'aumento del riscaldamento solare può spiegare in parte il riscaldamento degli inizi del secolo.**
- **3 grandi eruzioni vulcaniche** nel **1963**, **1982** e **1991** hanno causato **1-2 anni di raffreddamento**.
- Le misurazioni satellitari dal 1978 hanno mostrato che **non esiste una apprezzabile variazione nel riscaldamento solare negli ultimi 30 anni.**

1850 – 2007: attività solare

Il recente riscaldamento globale non può essere spiegato con l'attività solare o altri fattori naturali.

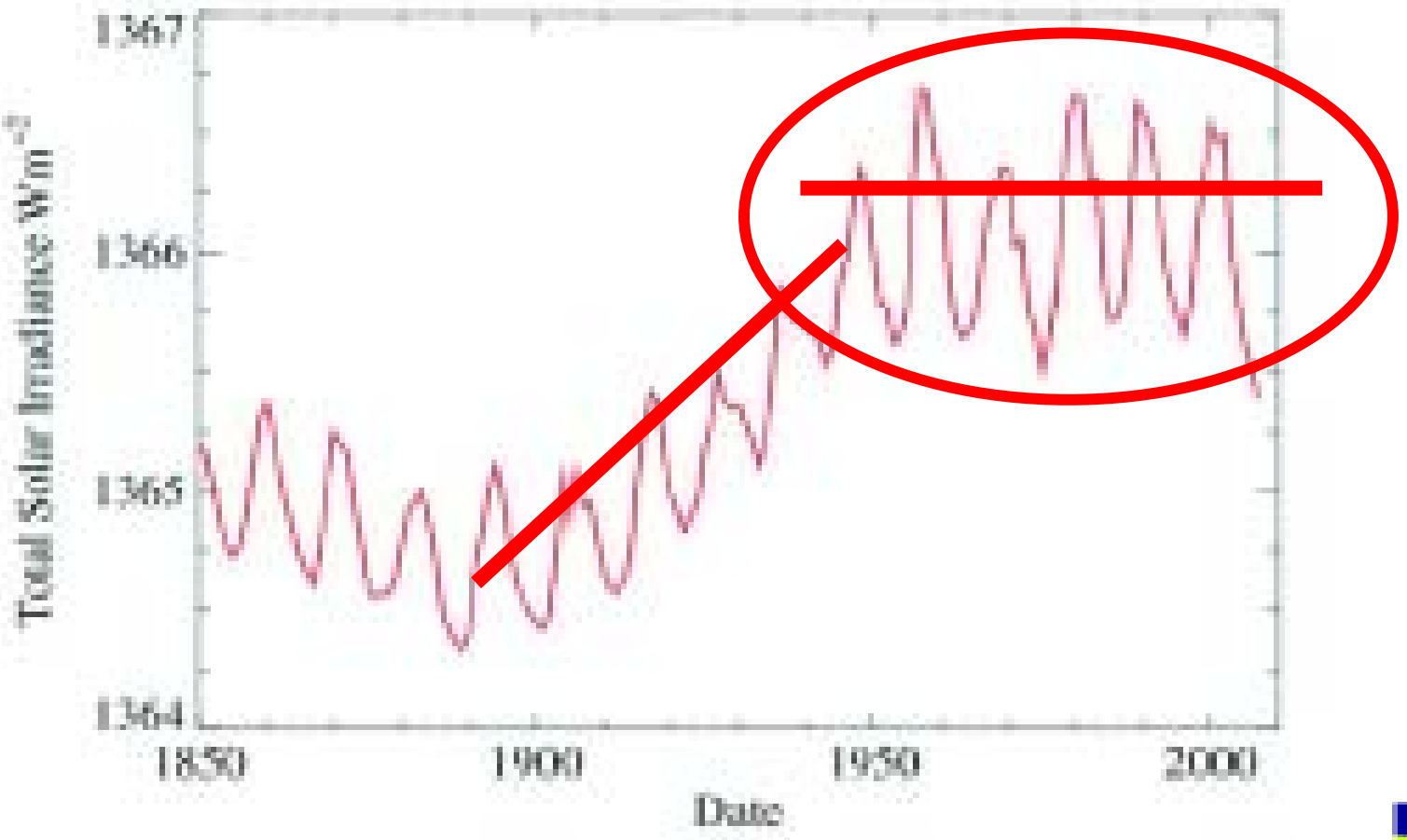


FIG 1 Solar activity 1850-2007

Tentativi di correlazione tra la lunghezza dei cicli solari con le temperature nell'Emisfero Nord (1):

1) *Friis-Christensen and Lassen (1991)* ;
periodo di studio: 1860-1990

2) *Lassen e Friis-Christensen (1995)*;
periodo di studio: 1579-1987

3) *Lassen e Friis-Christensen, (2000)*:
periodo di studio: 1579-1987

Tentativi di correlazione tra la lunghezza dei cicli solari con le temperature nell'Emisfero Nord (2):

I lavori di *Friis-Christensen and Lassen sono stati analizzati e studiati da altri scienziati:*

Damon,P. E., and A.N.Peristykh (1999),
"Solar cycle length and 20th century northern hemisphere warming:Revisited"
*Geophys.Res.Lett.,26,*2469–2472.

Laut,P. (2003),
"Solar activity and terrestrial climate: An analysis of some purported correlations"
J.Atmos. Solar-Terr.Phys.,65, 801–812.

Damon,P. E., and A.N.Peristykh (2005),
"Solar forcing of global temperature change since AD 1400"
ClimaticChange. Volume 68, No.1-2 /January, 2005

Tentativi di correlazione tra la lunghezza dei cicli solari con le temperature nell'Emisfero Nord (3):

Damon e Laut, (2004); Kristjansson et al,,
'Pattern of Strange Errors Plagues Solar Activity and Terrestrial Climate Data"
Eos,Vol. 85, No. 39, 28 September 2004

"Analysis of a number of published graphs that have played a major role in these debates and that have been claimed to support solar hypotheses [Laut, 2003; Damon and Peristykh,1999, 2004] shows that the apparent strong correlations displayed on these graphs have been obtained by incorrect handling of the physical data. The graphs are still widely referred to in the literature,and their misleading character has not yet been generally recognized. Readers are cautionedagainst drawing any conclusions, based upon these graphs, …"

Tentativi di correlazione tra la lunghezza dei cicli solari con le temperature nell'Emisfero Nord (3):

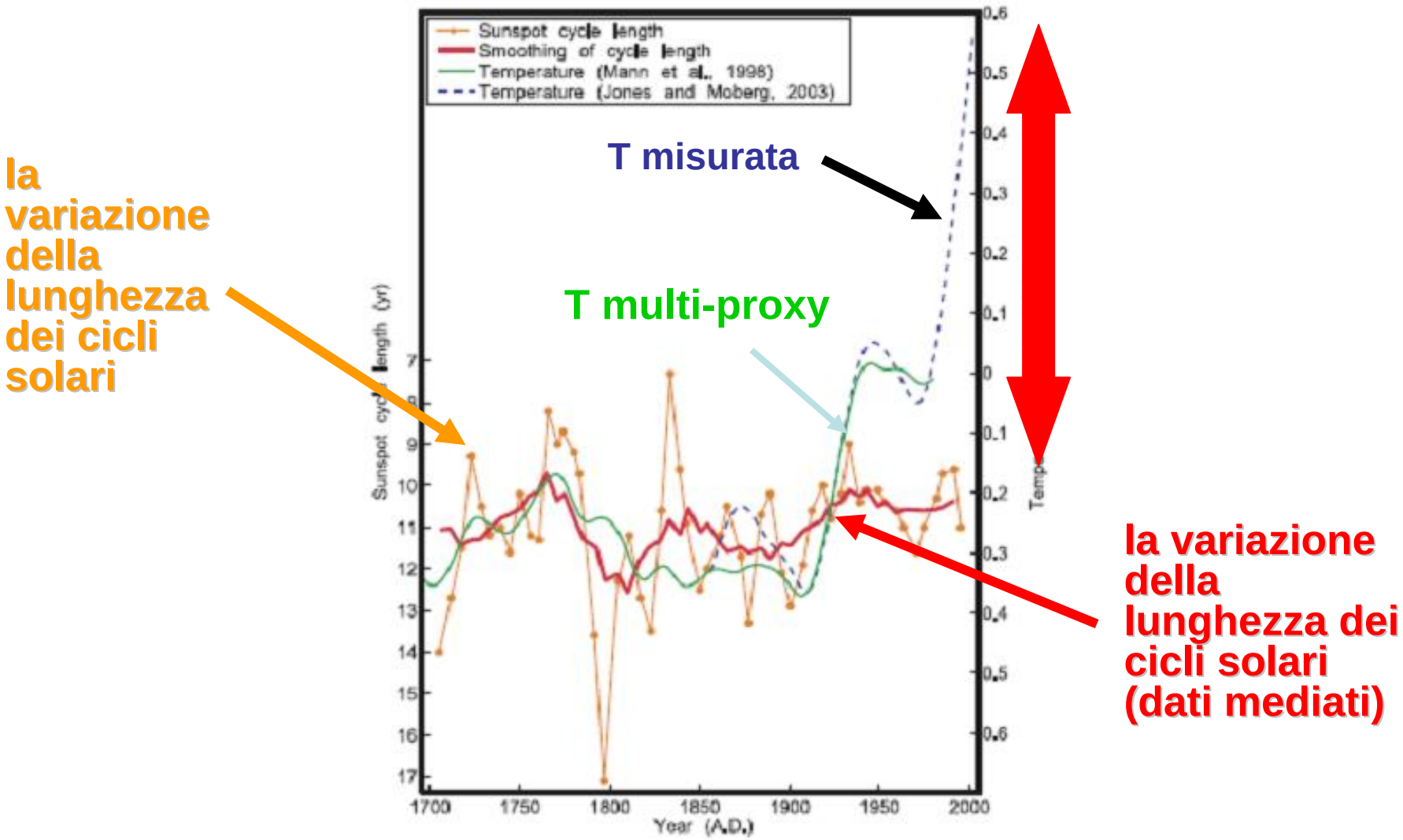
Damon e Laut, (2004); Kristjansson et al,,
'Pattern of Strange Errors Plagues Solar Activity and Terrestrial Climate Data"
Eos,Vol. 85, No. 39, 28 September 2004

"l'analisi dei grafici pubblicati che hanno avuto un grande ruolo in questi dibattiti e che sono stati usati per sostenere l'ipotesi solare. [Laut, 2003; Damon and Peristykh,1999, 2004] mostrano che ***le apparenti forti correlazioni mostrate in questi grafici sono state ottenute mediante una gestione non corretta dei dati fisici.*** *I grafici sono ancora molto citati in letteratura e la loro natura non corretta non è stata ancora generalmente riconosciuta. I lettori dovrebbero essere cauti nel trarre conclusioni basandosi su questi grafici …"*

Tentativi di correlazione tra la lunghezza dei cicli solari con le temperature nell'Emisfero Nord (4):

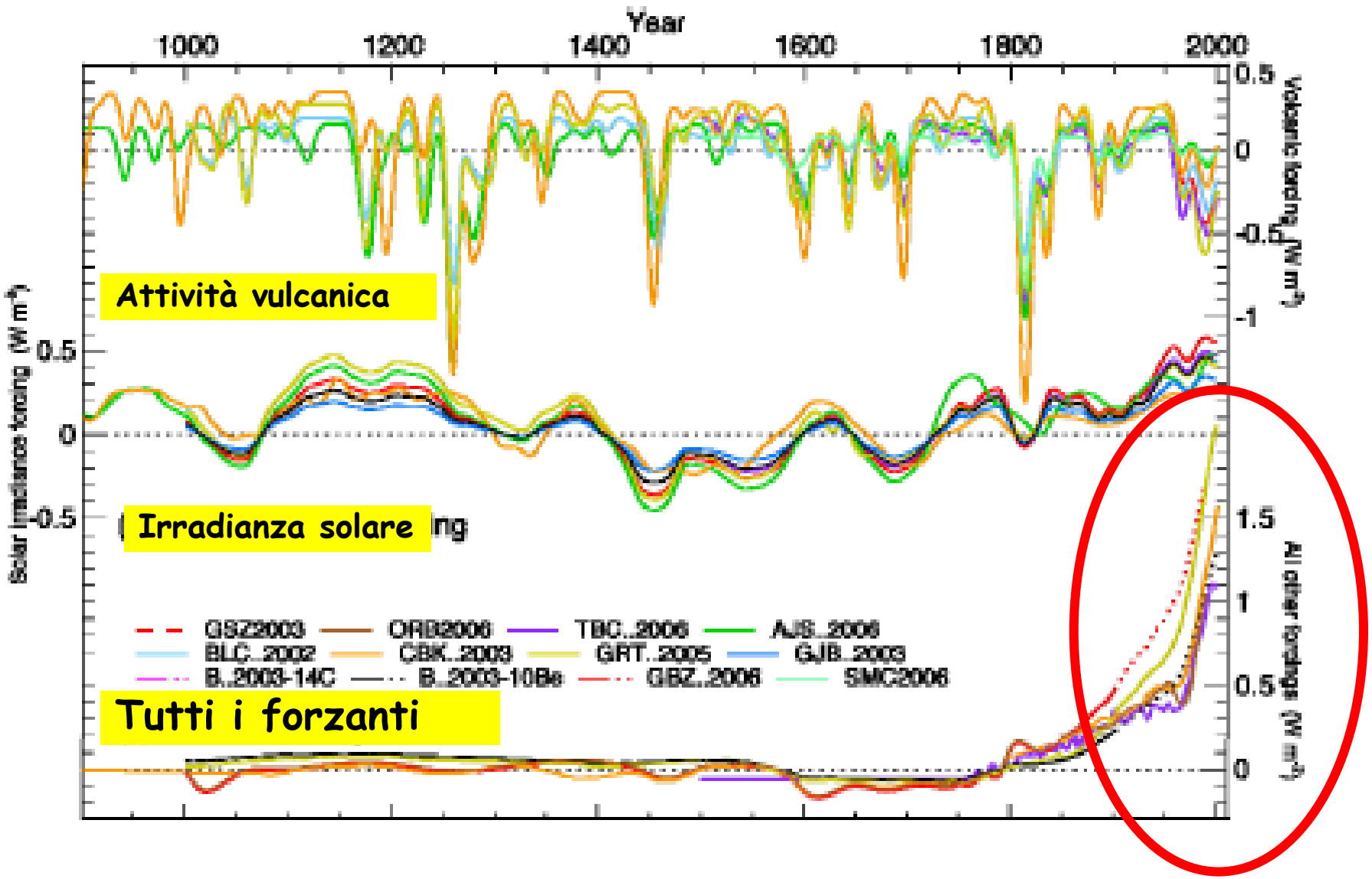
Riguardo ai risultati dell'articolo ***Friis-Christensen and Lassen (1991)***

*"In the **1991 article**, the impressive agreement of the solar curve with terrestrial temperatures during the global warming of the recent decennia had been a major factor in the article's strong impact.* ***But this agreement was actually an artifact: it had simply been obtained by adding, to a heavily smoothed ("filtered") curve, four additional points covering the period of global warming,which were only partially filtered or not filtered at all…"***



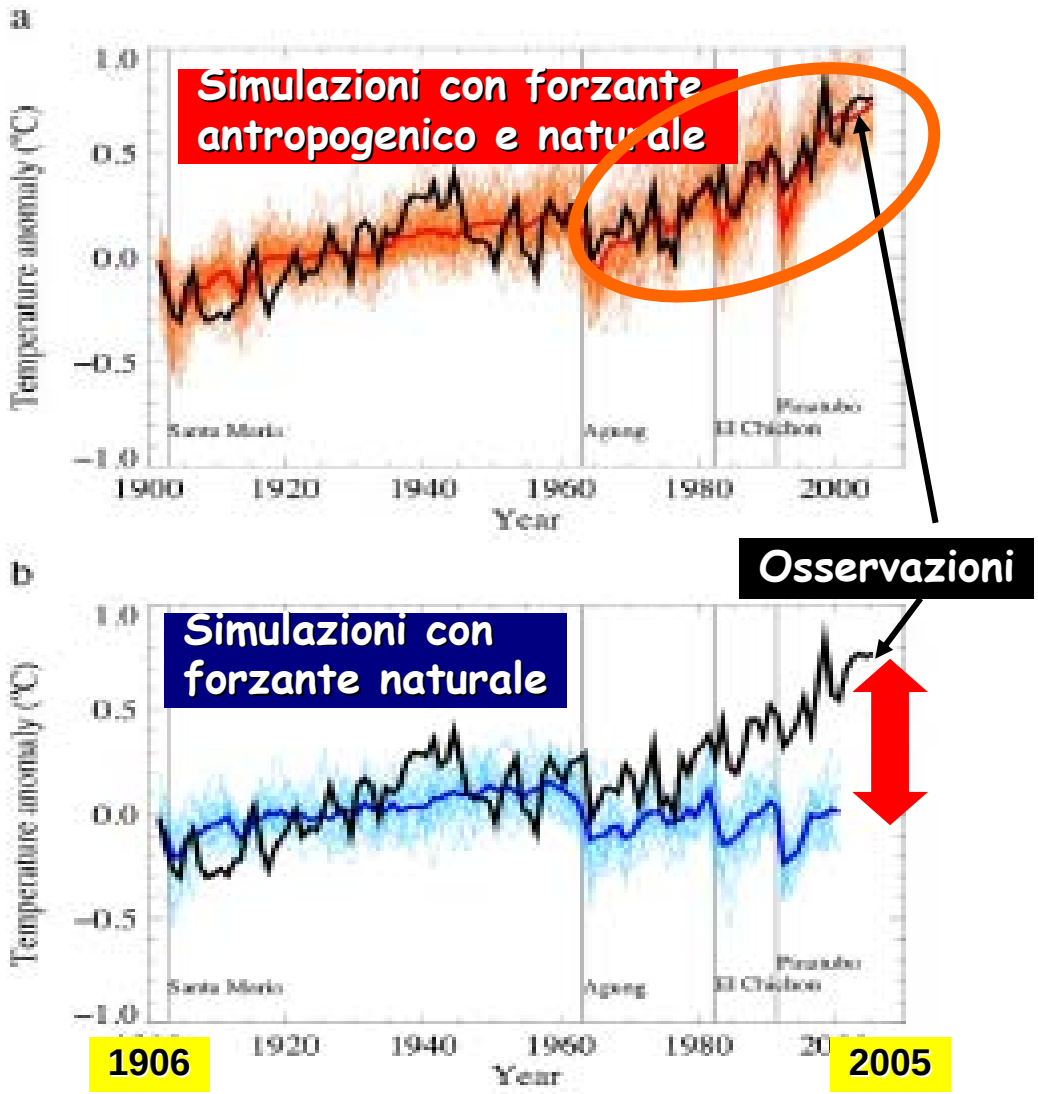
Confronto fra la variazione di temperatura misurata strumentalmente (tratteggio blu), da una ricostruzione "*multi proxy*" degli ulitmi 300 anni (verde) e la variazione della lunghezza dei cicli solari (arancio: dati originali; rosso: dati mediati per attenuare le variazioni annuali) (*Fonte: Damon e Laut, 2004*).

ULTIMI 1100 ANNI:
FORZANTI RADIATIVI E SIMULAZIONI DI TEMPERATURE



1906 – 2005:
Anomalie di T_{surf} globale relative a (1901-1950)

(58 Simulazioni con 14 AOGCM)



WGI – AR4 – IPCC (2007)

"I cambiamenti climatici sono causati dalle variazioni delle radiazioni cosmiche che influenzano la copertura nuvolosa …"

"Gli scettici"

Ipotesi:

L'aumento dell'attività delle macchie solari aumenta il **campo magnetico solare**, che può deflettere maggiormente **le radiazioni cosmiche galattiche**, che entrano nel nostro sistema solare e quindi ne riducono la quantità incidente sulla Terra.

Le radiazioni cosmiche galattiche incidenti l'atmosfera terrestre possono influenzare **la formazione delle nubi** di vapore acqueo mediante una crescita dei **nuclei di condensazione**.

Quando il Sole è più attivo, il suo campo magnetico è più intenso, i raggi cosmici galattici (particelle elettricamente cariche) sono maggiormente deviati da questo campo magnetico: quindi si ha un più debole flusso cosmico sulla Terra a cui corrisponde una minore formazione di nuvole e quindi un maggiore riscaldamento (meno nuvole meno schermatura della radiazione solare).

L'ipotesi dell'influenza delle radiazioni cosmiche galattiche sulla copertura nuvolosa pone <u>3 importanti questioni</u>:

1) Veramente i raggi cosmici influenzano la formazione delle nubi?

2) Se sì, come influenzano le temperature superficiali le variazioni nella copertura nuvolosa?

3) Infine tutto questo può spiegare il trend di riscaldamento globale osservato negli ultimi decenni?

"…It has been suggested that galactic cosmic rays with sufficient energy to reach the Troposphere could alter the population of cloud condensation nuclei and hence microphysical cloud properties (droplet number and concentration), inducing changes in cloud processes analogous to the indirect cloud albedo effect of tropospheric aerosols and thus causing an indirect solar forcing of climate. Studies have probed various correlations with clouds in particular regions or using limited cloud types or limited time periods…"

Technical Summary-WGI-AR4-IPCC (2007)

Svensmark (1998): correlazione tra flussi di radiazioni cosmiche e la copertura globale nuvolosa totale

Marsh and Svensmark (2000): correlazione tra flussi di radiazioni cosmiche e la copertura globale nuvolosa bassa

Questi studi mancano di chiare e consistenti evidenze scientifiche!

La correlazione con il TOTAL CLOUD COVER sparisce dopo il **1991**.

La correlazione con il LOW CLOUD COVER sparisce dopo il **1994**.

Solomon et al., (2007)

"…Together with **the lack of a proven physical mechanism and the plausibility of other causal factors** affecting changes in cloud cover, this makes the association between galactic cosmic ray-induced changes in aerosol and cloud formation **controversial…**"

Technical Summary-WGI-AR4-IPCC (2007)

CLOUD
Cosmics Leaving OUtdoor Droplets Experiment (2006)

Nel 2006 è iniziato al CERN (Ginevra) il progetto CLOUD, che ha lo scopo di investigare sulla possibile influenza dei raggi cosmici galattici sulla formazione delle nuvole.

CLOUD riproduce queste interazioni mandando un fascio di particelle (i raggi cosmici) dal *CERN Proton Synchrotron* dentro ad una camera di reazione e l'effetto di questo fascio sulla produzione di nuclei di condensazione viene registrato ed analizzato.

18 istituti scientifici e 9 Paesi Europeo, USA e Russia.

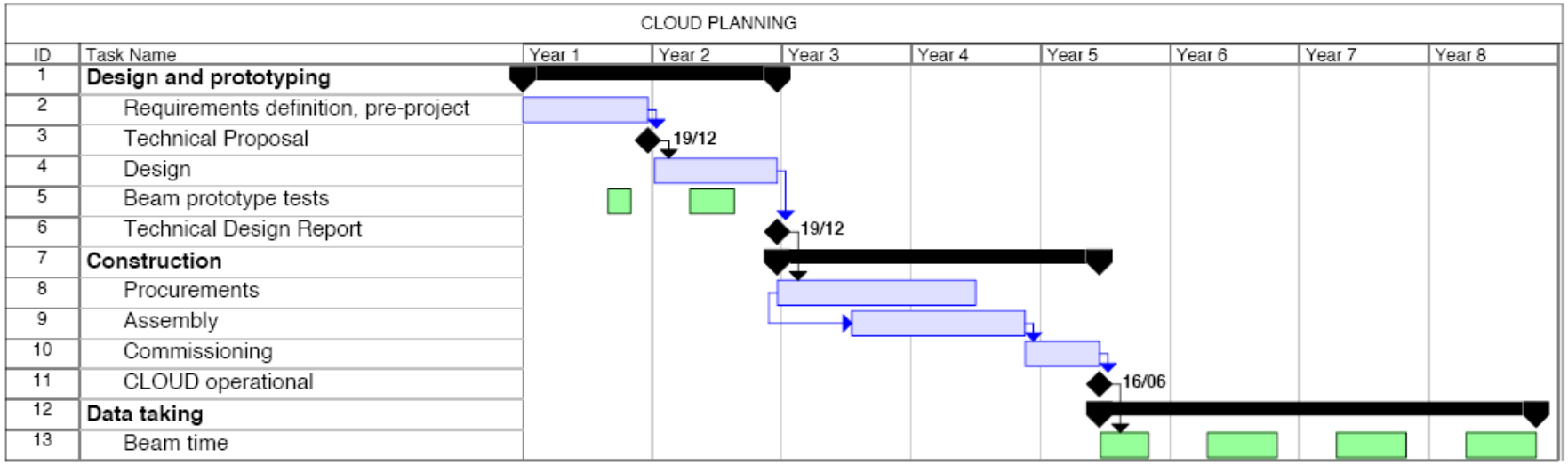


Fig. 2: CLOUD schedule and milestones.

Table 1: Estimated total cost of the CLOUD experiment.

Item	Cost [M€]	Ref.
Cloud facility	2.0	Table 2
Chamber analysers	1.7	Table 3
Sampling analysers	5.4	Table 4
Total:	**9.1 M€**	

CLOUD è un progetto in corso che durerà 8 anni.

J. E. Kristjánsson et al.
"Cosmic rays, cloud condensation nuclei and clouds - a reassessment using MODIS data."
***Atmospheric Chemistry and Physics*, 8, 7373-7387, 2008**

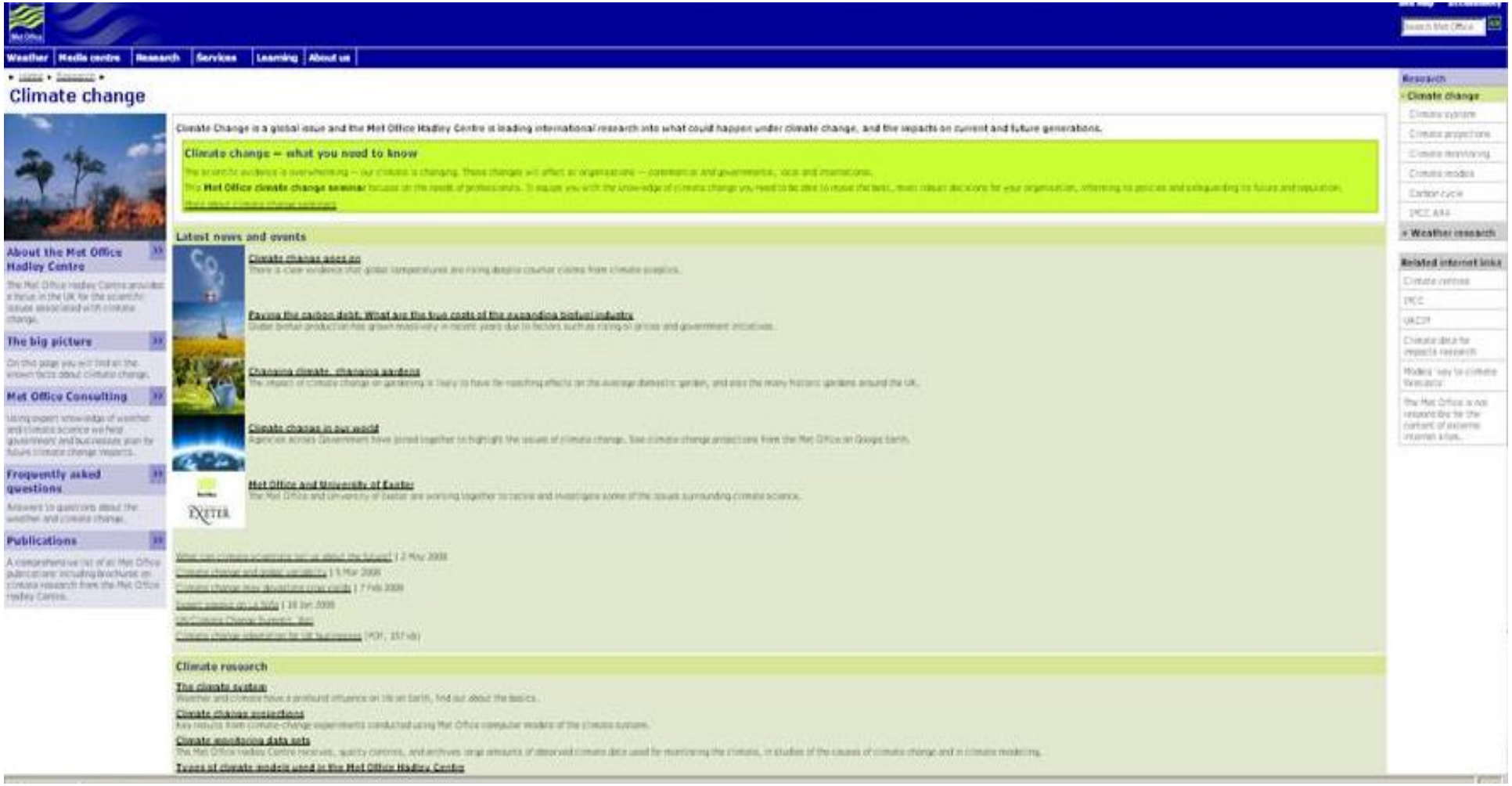
Sono state usate le osservazioni dei *Forbush decrease events* (improvvisi aumenti di attività solare che causano una forte riduzione dei raggi cosmici per un paio di giorni). Nello studio sono stati identificati 22 eventi nel periodo 2000-2005. Basandosi sui dati raccolti dal sensore satellitare MODIS si è investigato se questi eventi hanno influenzato la formazione delle nuvole. Si sono considerati anche i parametri microfisici delle nuvole come: *cloud droplet size, cloud water content* e *cloud optical depth*.

Nessuna correlazione statisticamente significativa è stata trovata tra uno dei parametri e i raggi cosmici galattici.

"Il riscaldamento globale è terminato nel 1998 e ora si ha un raffreddamento."

"Gli scettici"

http://www.metoffice.gov.uk/research/hadleycentre/



UK MetOffice

Met Office

http://www.metoffice.gov.uk/

HadCRUT3: Global surface temperatures

HadCRUT3 is a globally gridded product of near-surface temperatures, consisting of **annual differences from 1961-90 normals. It covers the period 1850 to present and is updated monthly.**

The data set is based on regular measurements of air temperature at a **global network of long-term land stations and on sea-surface temperatures measured from ships and buoys…**

Annual global averages

The annual timeseries illustrates the increase since the 1850s in global mean temperatures.

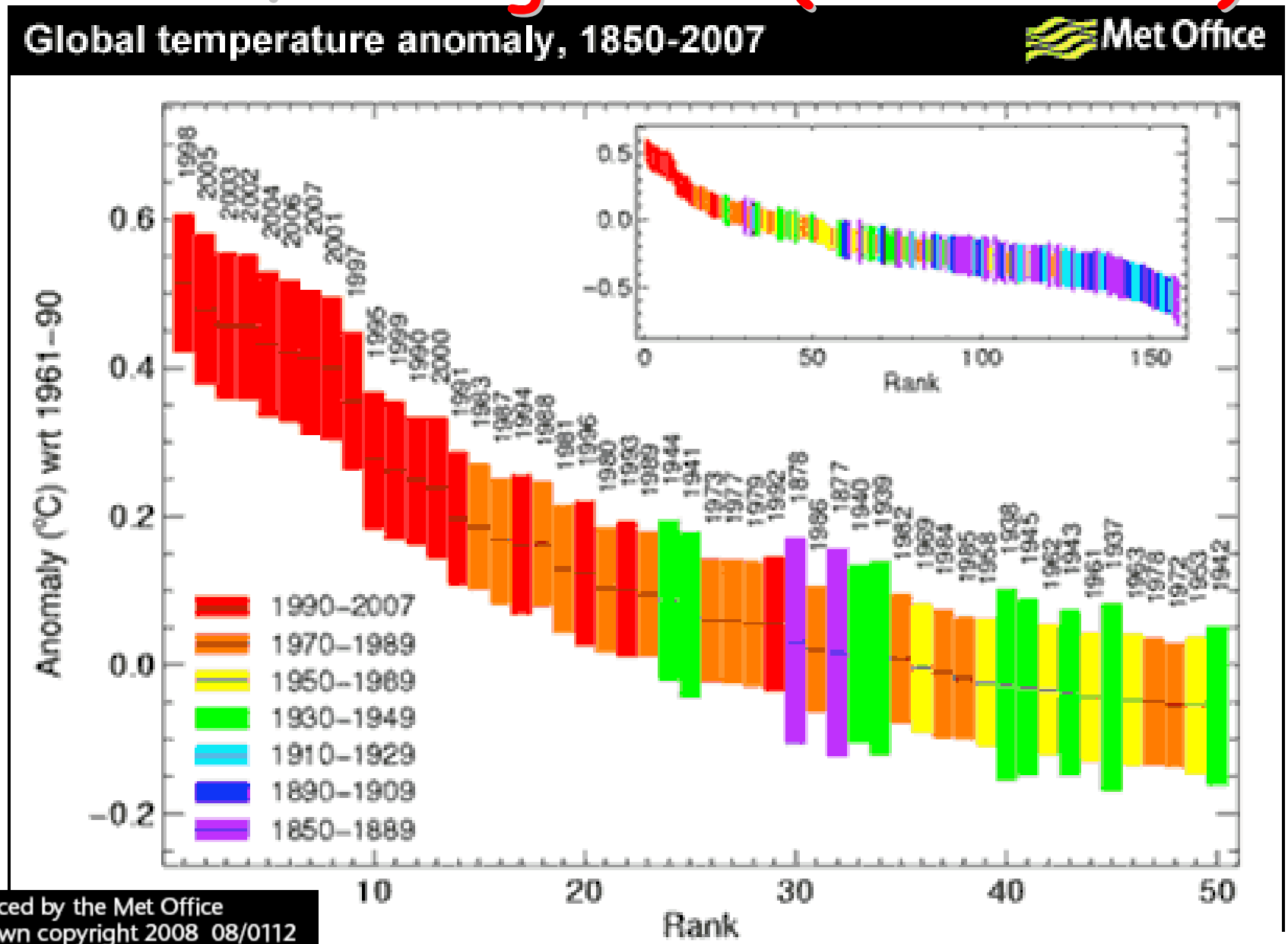
This increase is much larger than the known sources of error.

The warming has occurred in two main phases: 1920-40 and particularly since the mid-1970s.

Research at the Met Office Hadley Centre using state-of-the-art climate models has shown that **this behaviour can only adequately be accounted for by a combination of natural and human factors: the latter dominate.**

Fonte:
http://www.metoffice.gov.uk/climatechange/science/monitoring/hadcrut3.html

La classifica degli anni (1850-2007):



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Global temperature anomaly 1850-2007

La classifica degli anni:

Il 2007 è stato 0,37 °C più caldo della media 1961-1990 ed il **SETTIMO ANNO PIU' CALDO DAL 1850.**

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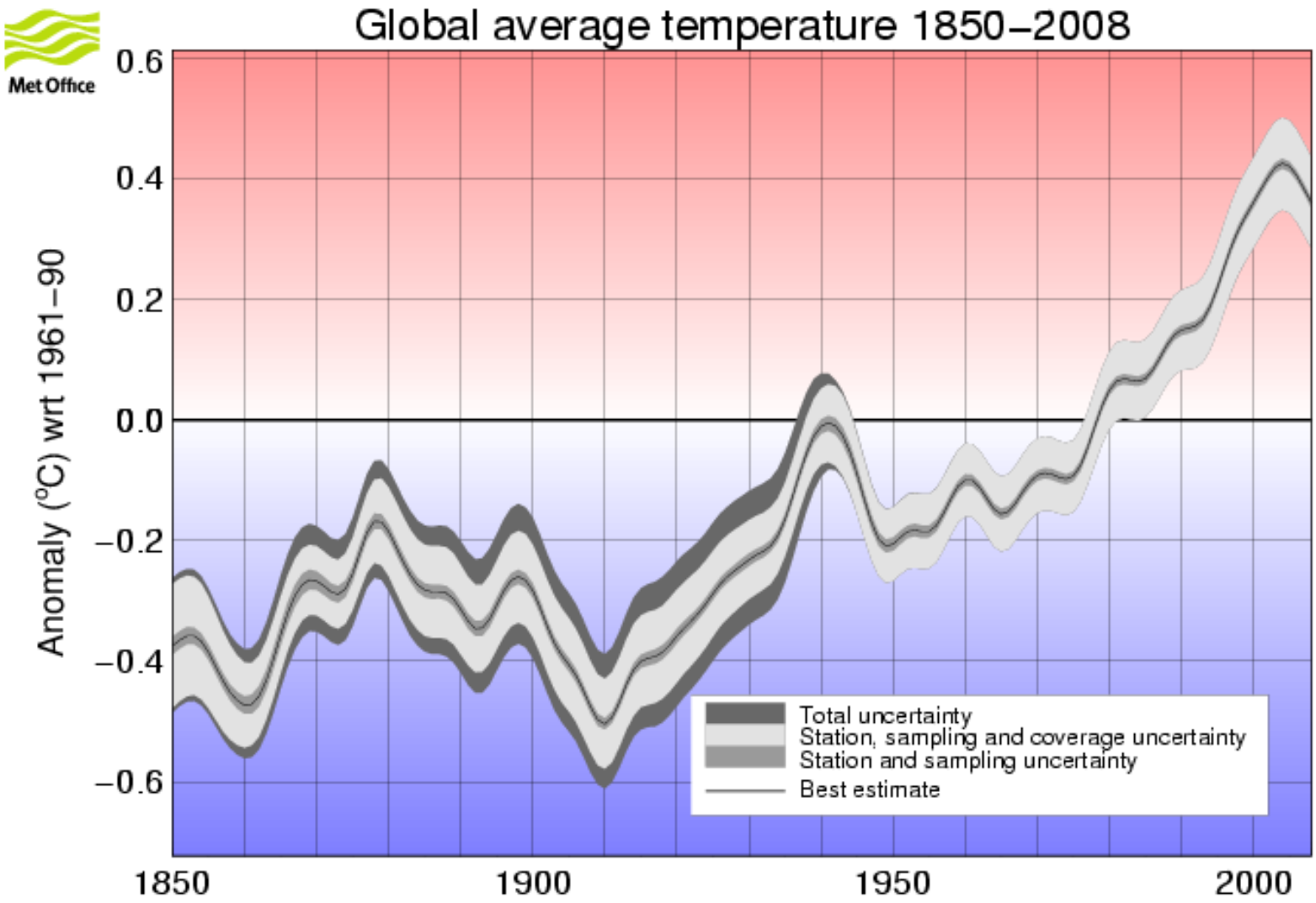
Osservazioni fino al 2008:

1850-2008: Global average temperature

Annual series smoothed with a 21-point binomial filter



Fonte: http://hadobs.metoffice.com/hadcrut3/diagnostics/global/nh+sh/

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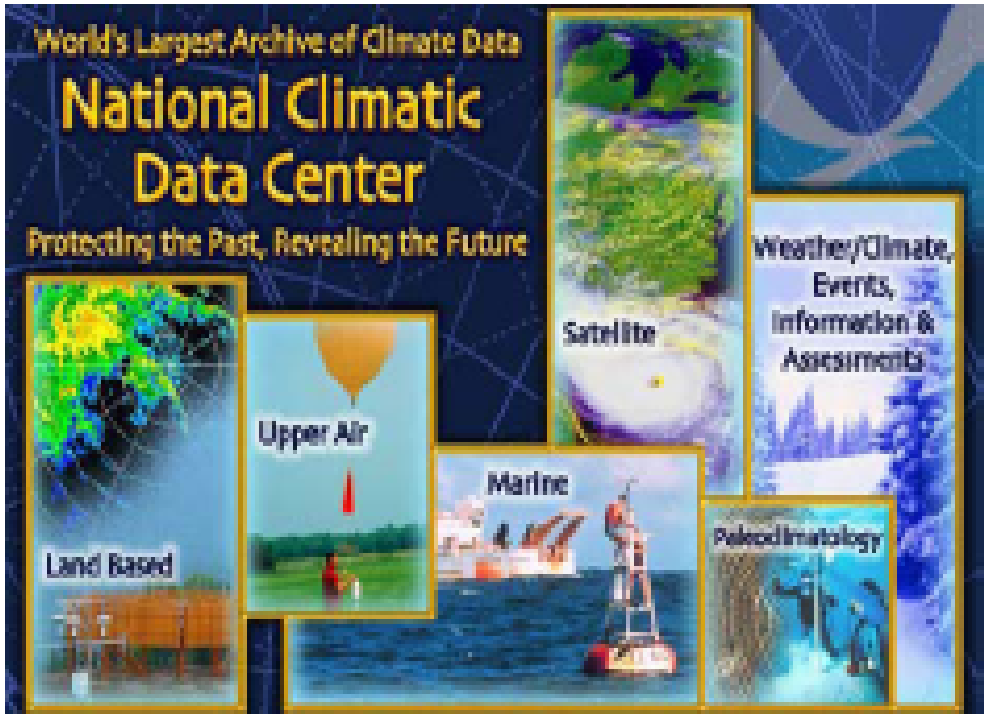

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Global Surface Temperature Anomalies

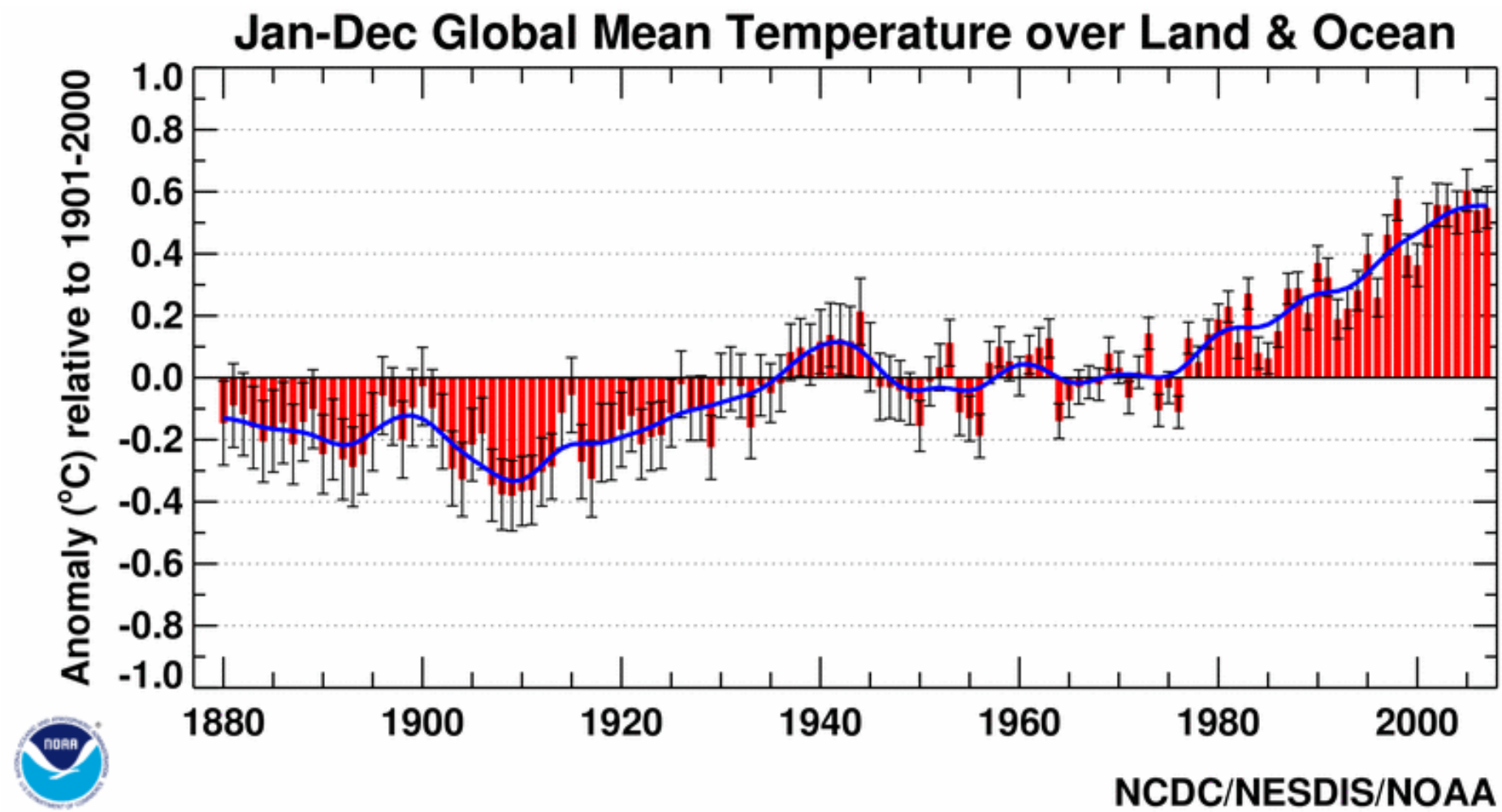
National Oceanic and Atmospheric Administration

National Climatic Data Center

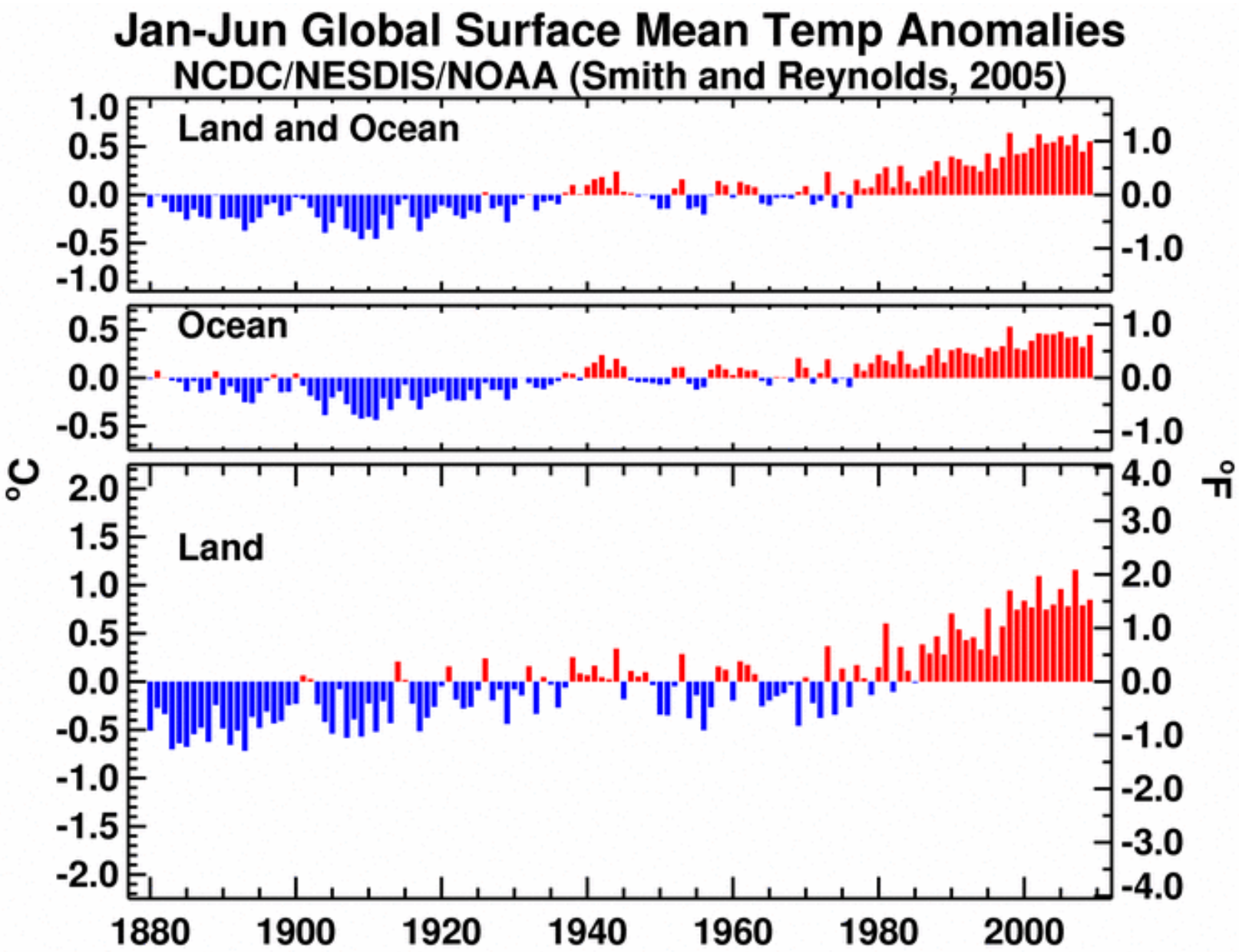
Overview

NCDC's long-term mean temperatures for the Earth were calculated by processing data from thousands of world-wide observation sites on land and sea for the entire period of record of the data. Many parts of the globe are inaccessible and therefore have no data. The temperature anomaly time series presented here were calculated in a way that did not require knowing the actual mean temperature of the Earth in these inaccessible areas such as mountain tops and remote parts of the Sahara Desert where there are no regularly reporting weather stations. Using the collected data available, the whole Earth long-term mean temperatures were calculated by interpolating over uninhabited deserts, inaccessible Antarctic mountains, etc. in a manner that takes into account factors such as the decrease in temperature with elevation. By adding the long-term monthly mean temperature for the Earth to each anomaly value, one can create a time series that approximates the temperature of the Earth and how it has been changing through time.

1880-2008:
Anomalie globali annuali (land and ocean combined) relative alla media 1901-2000



Fonte: http://www.ncdc.noaa.gov/img/climate/research/global-jan-dec-error-bar-pg.gif


Jan-Jun Global Surface Mean Temp Anomalies
NCDC/NESDIS/NOAA (Smith and Reynolds, 2005)
Land and Ocean
Ocean
Land
°C
°F
1.0
0.5
0.0
-0.5
-1.0
2.0
1.5
4.0
3.0
-1.5
-2.0
-3.0
-4.0
1880
1900
1920
1940
1960
1980
2000

1880-2008: Anomalie globali annuali (land and ocean combined)

1880	-0.1466
1881	-0.0896
1882	-0.1182
1883	-0.1607
1884	-0.2056
1885	-0.1720
1886	-0.1456
1887	-0.2147
1888	-0.1425
1889	-0.1012
1890	-0.2467
1891	-0.1992
1892	-0.2631
1893	-0.2879
1894	-0.2482
1895	-0.1748
1896	-0.0578
1897	-0.0925
1898	-0.1997
1899	-0.0967
1900	-0.0282
1901	-0.0976
1902	-0.1736
1903	-0.2930
1904	-0.3286
1905	-0.2160
1906	-0.1800
1907	-0.3469
1908	-0.3770
1909	-0.3806
1910	-0.3657
1911	-0.3622
1912	-0.3039
1913	-0.2861
1914	-0.1134
1915	-0.0560
1916	-0.2710
1917	-0.3266
1918	-0.2099
1919	-0.2072
1920	-0.1676
1921	-0.1226
1922	-0.2144
1923	-0.1906
1924	-0.1850
1925	-0.1145
1926	-0.0214
1927	-0.0994
1928	-0.0979
1929	-0.2246
1930	-0.0252
1931	-0.0037
1932	-0.0271
1933	-0.1606
1934	-0.0244
1935	-0.0497
1936	-0.0180
1937	0.0827
1938	0.0979
1939	0.0747
1940	0.1162
1941	0.1378
1942	0.1240
1943	0.1177
1944	0.2132
1945	0.0665
1946	-0.0289
1947	-0.0306
1948	-0.0414
1949	-0.0682
1950	-0.1556
1951	-0.0119
1952	0.0337
1953	0.1127
1954	-0.1117
1955	-0.1315
1956	-0.1879
1957	0.0488
1958	0.0992
1959	0.0528
1960	0.0047
1961	0.0743
1962	0.0977
1963	0.1271
1964	-0.1401
1965	-0.0734
1966	-0.0299
1967	-0.0143
1968	-0.0213
1969	0.0785
1970	0.0323
1971	-0.0645
1972	0.0177
1973	0.1427
1974	-0.1048
1975	-0.0320
1976	-0.1108
1977	0.1281
1978	0.0502
1979	0.1405
1980	0.1885
1981	0.2292
1982	0.1132
1983	0.2714
1984	0.0796
1985	0.0624
1986	0.1490
1987	0.2866
1988	0.2886
1989	0.2089
1990	0.3702
1991	0.3241
1992	0.1895
1993	0.2227
1994	0.2820
1995	0.3991
1996	0.2585
1997	0.4630
1998	0.5774
1999	0.3972
2000	0.3673
2001	0.4953
2002	0.5591
2003	0.5583
2004	0.5352
2005	0.6061
2006	0.5563
2007	0.5481
2008	0.4870

ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual.land_and_ocean.90S.90N.df_1901-2000mean.dat

“Il 2008 è stato un anno freddo!”

“Gli scettici”

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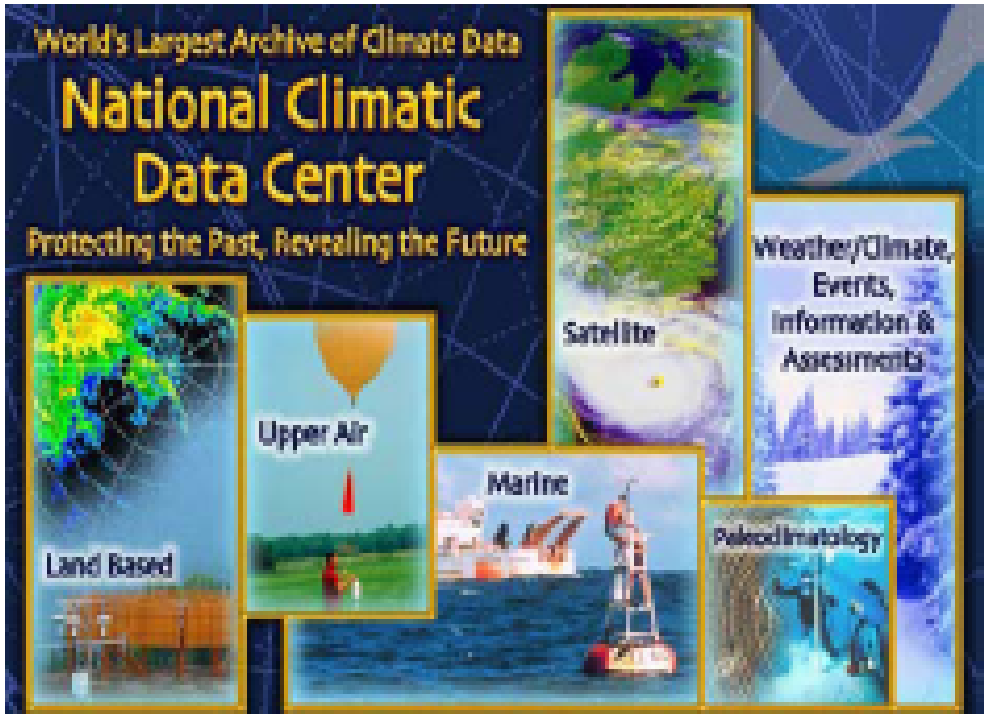

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Climate of 2008 - in Historical Perspective Annual Report

National Climatic Data Center
14 January 2009

Contents of this Report:

- Major Highlights
- Global Analysis
- ENSO Conditions

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Fonte:
http://www.ncdc.noaa.gov/oa/climate/research/2008/ann/ann08.html

Major Highlights

NOAA: 2008 Global Temperature Ties as 8th Warmest on Record

The year 2008 tied with 2001 as the eighth warmest year on record for the Earth, based on the combined average of worldwide land and ocean surface temperatures through December, according to a preliminary analysis by NOAA's National Climatic Data Center in Asheville, N.C. For December alone, the month also ranked as the eighth warmest globally, for the combined land and ocean surface temperature. The assessment is based on records dating back to 1880.

The analyses in NCDC's global reports are based on preliminary data, which are subject to revision. Additional quality control is applied to the data when late reports are received several weeks after the end of the month and as increased scientific methods improve NCDC's processing algorithms.

NCDC's ranking of 2008 as the eighth warmest year compares to a ranking of ninth

Completato

Fonte:
http://www.ncdc.noaa.gov/oa/climate/research/2008/ann/ann08.html

NCDC's ranking of 2008 as the eighth warmest year compares to a ranking of ninth warmest based on an analysis by NASA's Goddard Institute for Space Studies. The NOAA and NASA analyses differ slightly in methodology, but both use data from NOAA's National Climatic Data Center - the federal government's official source for climate data.

Global Temperature Highlights - 2008

The combined global land and ocean surface temperature from January-December was 0.88 degree F (0.49 degree C) above the 20th Century average of 57.0 degrees F (13.9 degrees C). Since 1880, the annual combined global land and ocean surface temperature has increased at a rate of 0.09 degree F (0.05 degree C) / decade. This rate has increased to 0.29 degree F (0.16 degree C) / decade over the past 30 years.

Separately, the global land surface temperature for 2008, through December, was sixth warmest, with an average temperature 1.46 degrees F (0.81 degree C) above the 20th Century average of 47.3 degrees F (8.5 degrees C).

Also separately, the global ocean surface temperature for 2008, through December, was 0.67 degree F (0.37 degree C) above the 20th Century average of 60.9 degrees F (16.1 degrees C) and ranked tenth warmest.

Fonte:
http://www.ncdc.noaa.gov/oa/climate/research/2008/ann/ann08.html

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE

NOAA: il 2008 è l'OTTAVO ANNO PIU' CALDO nel record dal 1880

L'anno 2008 con il 2001 è l'ottavo anno più caldo nel record globale, basandosi su la media combinata delle temperature superficiali terrestri e marine del globo da gennaio a dicembre 2008, secondo l'analisi preliminare del **NOAA National Climatic Data Center (NCDC)** in Asheville, N.C.

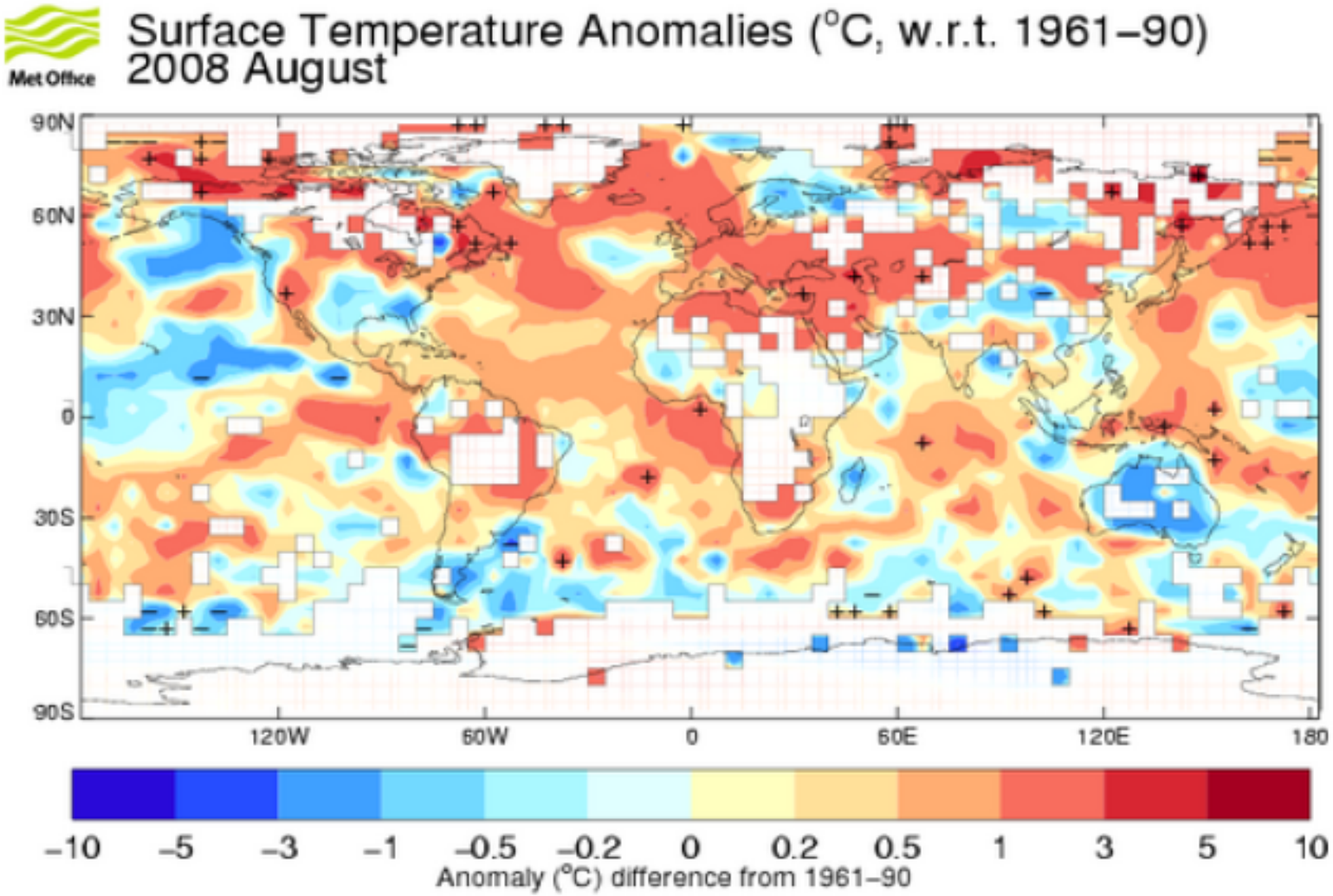
Il mese di Dicembre 2009 da solo è **l'OTTAVO PIU' CALDO** globalmente. La valutazione è basata su dati che **iniziano dal 1880.**

E l'agosto 2008?

August 2008

Met Office Hadley Centre observations datasets

HadCRUT3 dataset: January 1850-August 2008



Climate of 2008
August in Historical Perspective

National Climatic Data Center
16 September 2008

August Global Highlights

The August 2008 combined global land and ocean surface temperature was 0.79 degrees F (0.44 degrees C) above the 20th century mean of 60.1 degrees F (15.6 degrees C) and tied with 1995 for the tenth warmest August on record.

The global land surface temperature for August was 0.88 degrees F (0.49 degrees C) above the 20th century mean of 56.9 degrees F (13.8 degrees C).

The global ocean surface temperature for August was 0.77 degrees F (0.43 degrees C) above the 20th century mean of 61.4 degrees F (16.4 degrees C), which tied for seventh warmest August with 2001.

Perché nel 2007- 2008 l'aumento delle temperature globali è minore rispetto al passato?

NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)

National Climatic Data Center
U.S. Department of Commerce

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DOC > NOAA > NESDIS > NCDC

Search Field: Search NCDC

Climate Monitoring | Climate of 2008 | ENSO | Help

El Niño / Southern Oscillation (ENSO) Annual 2008

National Oceanic and Atmospheric Administration

National Climatic Data Center

Fonte:
http://www.ncdc.noaa.gov/oa/climate/research/enso/index.php?year=2008&month=13&submitted=Get+Report

All'inizio del 2008 il segnale **ENSO** era nella **fase fredda (La Nina)** e che si era sviluppata nel **settembre 2007** e ha **raggiunto il massimo nel febbraio 2008.** Questa fase fredda ha iniziato a diminuire in **Marzo 2008** e si è completamente dissolta in **Giugno 2008**.

Durante la prima metà del 2008 le anomalie di SST (*Sea Surface Temperature*) osservate nell'Oceano Pacifico Centrale e Orientale Equatoriale erano sotto la media. Le anomali SST più fredde sono state osservate in Febbraio 2008 nella ***Niño 3.4 region.*** Entro Giugno 2008, le anomalie SST equatoriali si sono riscaldate e hanno raggiunto quasi i valori normali per la regione dell'Oceano pacifico Centrale (**Fase Neutrale dell'ENSO**).

Una altra **La Nina è iniziata in novembre 2008** (anomalie fredde di SST si sono sviluppate nel Pacifico tropicale orientale ed occidentale). **La Nina ha continuato durante il gennaio 2009.**
La maggioranza delle previsioni per la regione Niño-3.4 indicano un **graduale indeblimento della Nina nel periodo febbraio-aprile 2009** con una eventuale transizione ad una Fase Neutrale di ENSO.

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Climate Monitoring | Climate of 2008 | ENSO | Help

El Niño / Southern Oscillation (ENSO) Annual 2008

National Oceanic and Atmospheric Administration

National Climatic Data Center

Use these links to access detailed analyses of Annual 2008 Global and U.S. data.

Global Analysis | Global Hazards | United States | U.S. Drought

Use the form below to access detailed monthly report.

« December 2008

Year: 2008 **Month:** Annual Get Report

December 2008 Overview Discussion

Fonte:
http://www.ncdc.noaa.gov/oa/climate/research/enso/?year=2008&month=13&submitted=Get+Report

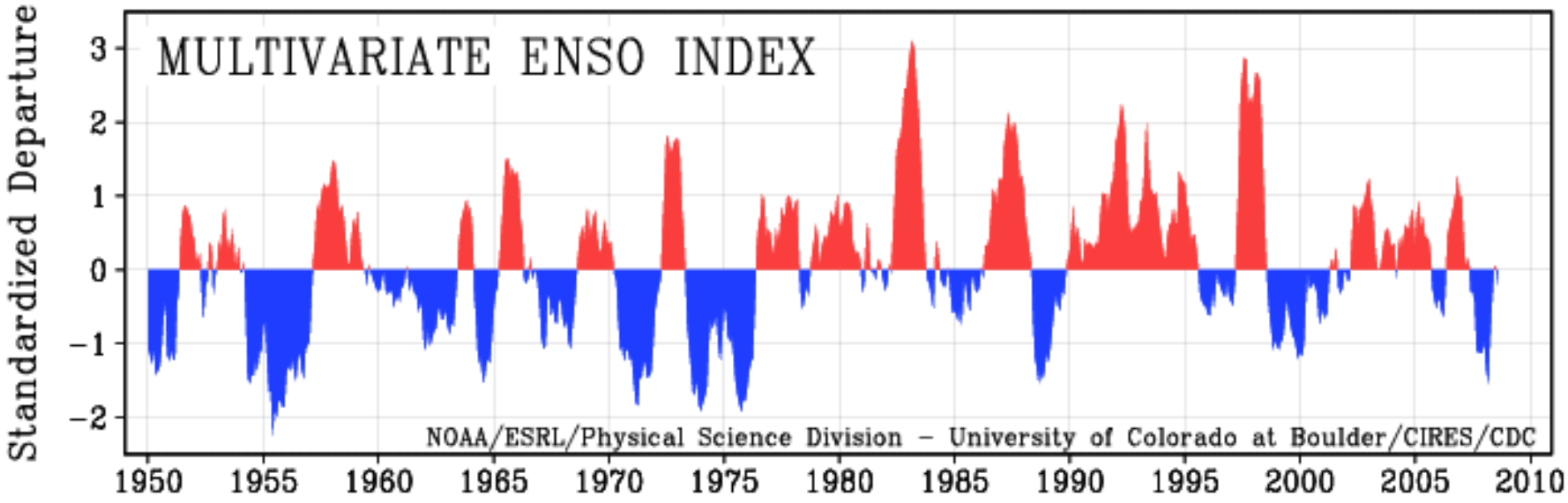
Oceanic Conditions:

The El Niño/Southern Oscillation (ENSO) began 2008 in a cold phase (i.e., La Niña) which developed during September of 2007, peaked in February 2008, began to dissipate in March, and completely disolved by June. During the first half of 2008, below average sea-surface temperature (SST) anomalies were observed in the central and eastern equatorial Pacific Ocean, with the coldest SST anomalies measured in February in the Niño 3.4 region. By June 2008, the near-equatorial SST anomalies had warmed to near-normal in the central Pacific region as the ENSO transitioned to a neutral phase.

In the western equatorial Pacific, SSTs returned to near-average temperatures by July, remaining near average through November. This can be seen in the monthly averaged SST anomalies in the Niño 4 region. Cooling in the upper-ocean along the equatorial Pacific in the latter part of 2008 did give some indication of the possible late onset of an ENSO cold event. However, neutral ENSO conditions remained at the end of the year, with below-average SSTs.

A slight cooling began in late October when colder SST anomalies developed along the equatorial zone due to stronger than average trade-wind flow, which enhanced upwelling and decreased SST anomalies in both the eastern and central tropical Pacific.

Fonte:
http://www.ncdc.noaa.gov/oa/climate/research/enso/?year=2008&month=13&submitted=Get+Report


MULTIVARIATE ENSO INDEX
Standardized Departure
3
2
1
0
−1
−2
NOAA/ESRL/Physical Science Division – University of Colorado at Boulder/CIRES/CDC
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010

EL NIÑO/SOUTHERN OSCILLATION (ENSO)DIAGNOSTIC DISCUSSION

issued by

CLIMATE PREDICTION CENTER/NCEP/NWS

5 February 2009

ENSO Alert System Status: La Niña Advisory

Synopsis: La Niña is expected to continue into Northern Hemisphere Spring 2009.

La Niña continued during January 2009, as evidenced by below-average equatorial sea surface temperatures (SST) across the central and east-central Pacific Ocean…

Negative subsurface oceanic heat content anomalies (average temperatures in the upper 300m of the ocean) also persisted east of the International Date Line, but weakened as positive subsurface temperature anomalies from the western Pacific expanded eastward into the central Pacific.

A majority of the model forecasts for the Niño-3.4 region indicate a **gradual weakening of La Niña through February-April 2009, with an eventual transition to ENSO-neutral conditions.** Therefore, based on current observations, recent trends, and model forecasts, **La Niña is expected to continue into the Northern Hemisphere Spring 2009.**

E l'anno 2009?

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National Climatic Data Center
U.S. Department of Commerce

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Climate Monitoring / Climate of 2009 / June / Help

Climate of 2009
June in Historical Perspective

National Climatic Data Center

16 July 2009

Fonte: *http://www.ncdc.noaa.gov/oa/climate/research/2009/jun/jun09.html*

Major Highlights

NOAA: June Temperature Near-Average for the U.S.; Global Temperature Ranked 2nd Warmest on Record for June; Ocean Surface Temperatures Warmest on Record for June

The June 2009 temperature and precipitation for the contiguous United States were near the long-term average, based on records going back to 1895, according to an analysis by NOAA's National Climatic Data Center in Asheville, N.C.

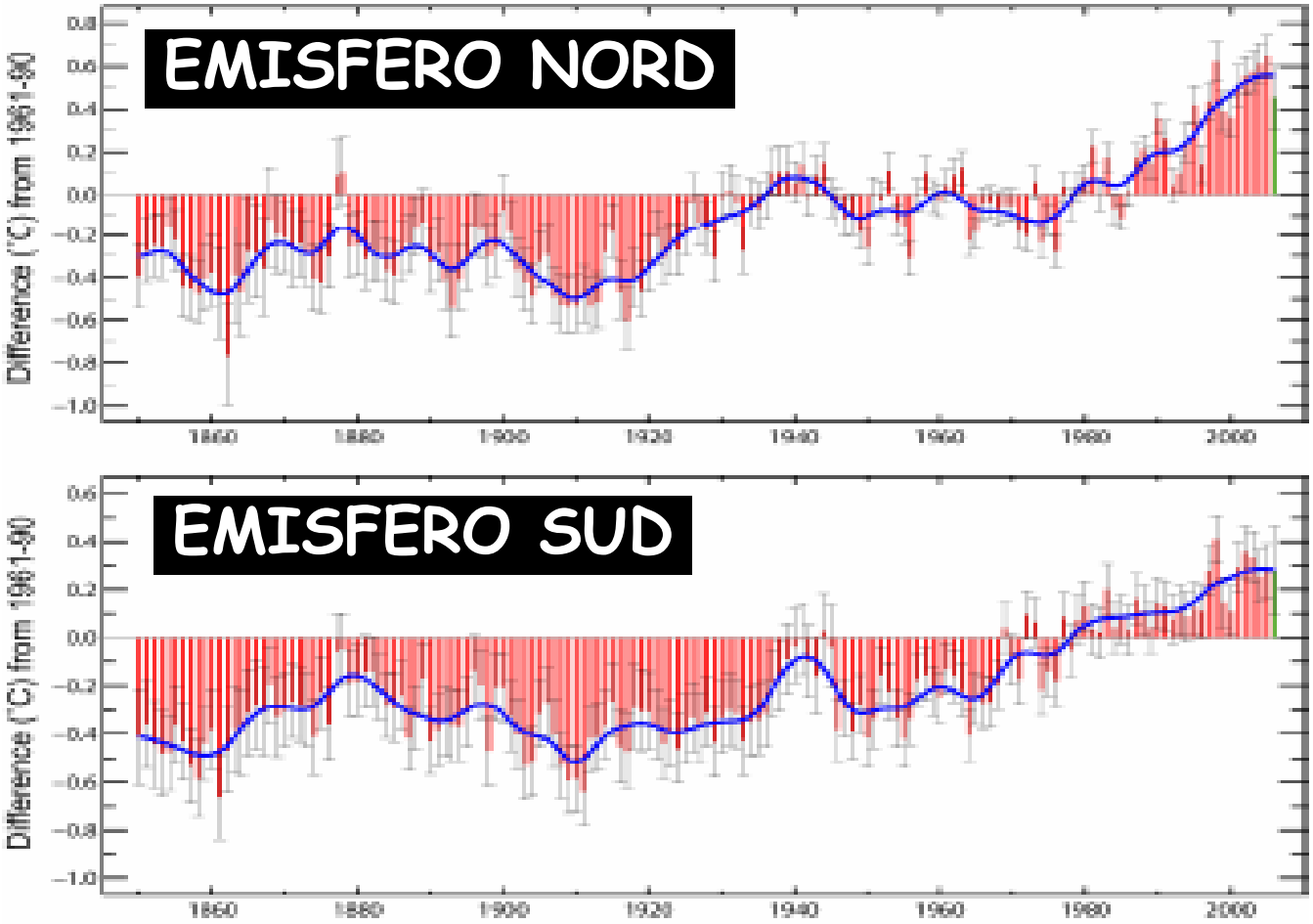
The average June 2009 temperature of 69.5°F was 0.2°F above the 20th Century average. Precipitation across the contiguous United States in June 2009 averaged 2.90 inches, which is 0.01 inch above the long-term value.

The world's ocean surface temperature was the warmest on record for June, breaking the previous high mark set in 2005, according to a preliminary analysis by NOAA's National Climatic Data Center in Asheville, N.C. Additionally, the combined average global land and ocean surface temperature for June was second-warmest on record. The global records began in 1880.

“Ma il riscaldamento non è globale!”

“Gli scettici”

Riscaldamento globale: Emisfero Nord e Emisfero Sud



1850 – 2006: ANOMALIE di temperature superficiali atmosferiche e temperature superficiali marine (SST) relative al periodo 1961-1990 (*HadCRUT3*)

WGI-AR4-IPCC (2007)

"Le misure strumentali di temperatura sono influenzate dalle isole urbane di calore…"

"Gli scettici"

L'effetto delle ISOLE URBANE DI CALORE sulle misure delle temperature superficiali atmosferiche globali è TRASCURABILE.

- **Gli effetti dell' "*Urban heat islands*" sono reali, ma locali !**

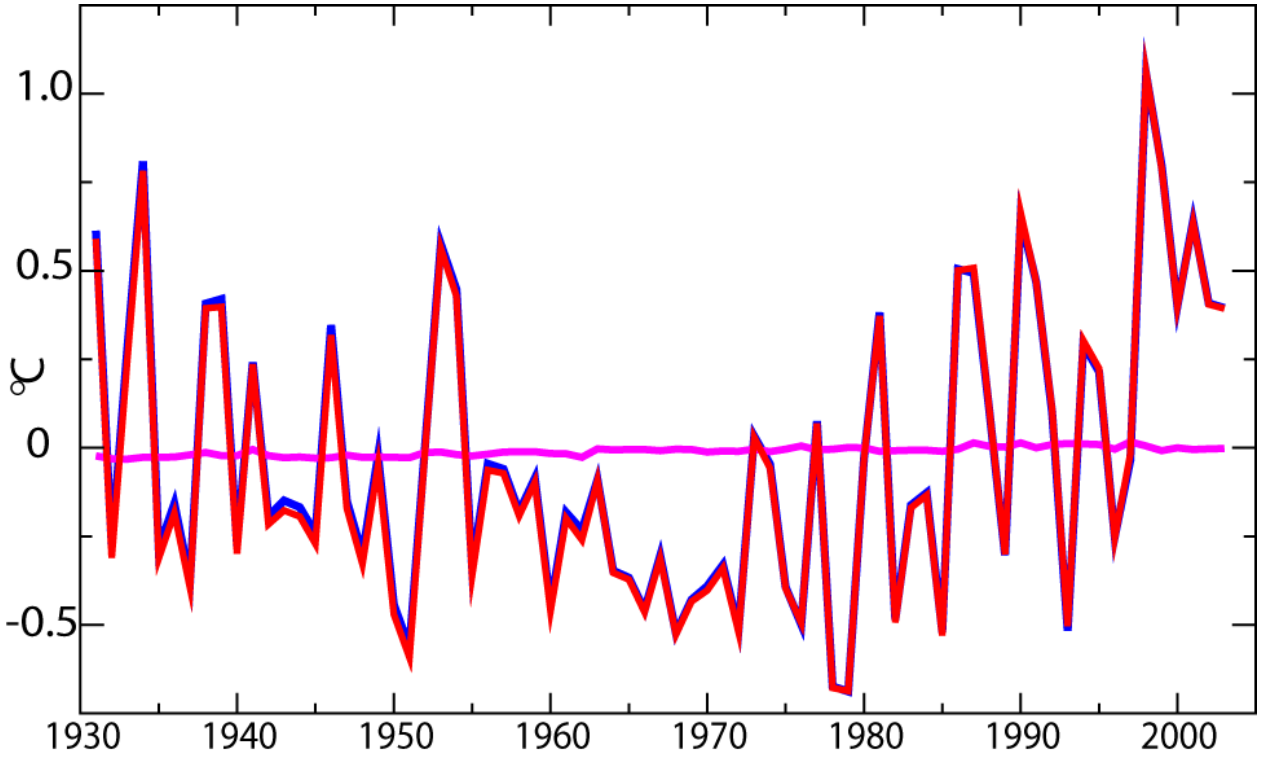
  I siti urbani sono stati identificati ed esclusi dai record globali di temperatura (circa l'1%).

  Inoltre sono stati stimati i possibili effetti: meno di **0,006°C per decennio** **sulle stazioni terrestri.**

WGI-AR4-IPCC (2007)

Gli effetti urbani sul record globale di Ts sono trascurabili!

(Peterson, 2003;
Peterson and Owen,2005)



Esempio:

Anomalie di Tsurf rispetto a (1961-1990)
(United States Historical Climatology Network - USHCN):

(rosso): USHCN anomalie (°C).

- (blue): USHCN anomalie senza il 16% delle stazioni (popolazione > 30000 persone entro 6km nel 2000)

WGI-AR4-IPCC (2007)

"I satelliti non misurano l'aumento della temperatura nella bassa e media troposfera."

"Gli scettici"

Nuove analisi di misure della temperatura con satelliti e radiosonde della bassa e media troposfera mostrano che le variazioni di riscaldamento sono consistenti tra di loro e con quelli misurati alla superficie.

Dal 1979:

Riscaldamento globale superficiale:

0.16°C - 0.18°C per decennio,

Riscaldamento globale troposferico:

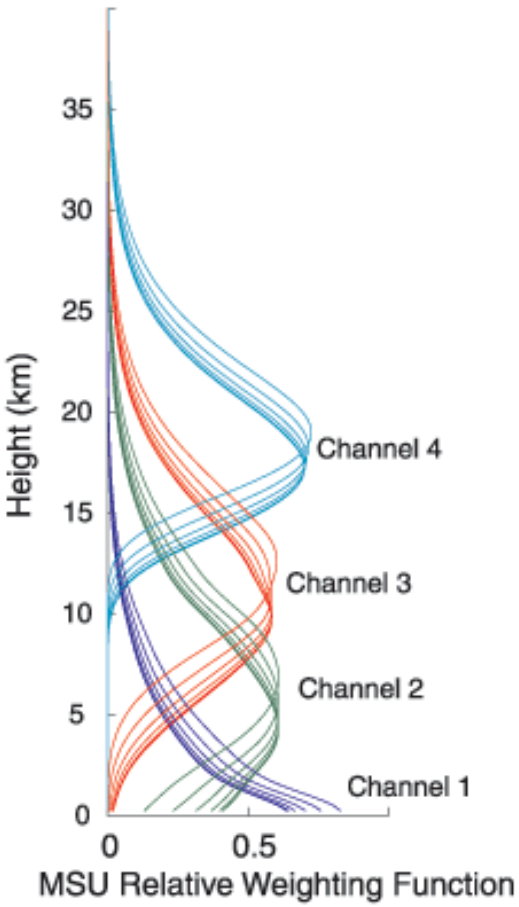
0.12°C - 0.19°C per decennio

WGI-AR4-IPCC (2007)

Misure satellitari di temperatura:

I **satelliti orbitanti attorno alla Terra** misurano in maniera indiretta tramite dei sensori **la temperatura dell'aria**: rilevano le radiazioni in varie bande di lunghezze d'onda, e poi indirettamente risalgono alla temperatura.

Il sistema viene utilizzato dal ***NOAA (National Oceanic and Atmospheric Administration)*** dal **1979** nei suoi satelliti polari, che misurano l'intensità di "risalita" (*upwelling*) della radiazione a microonde dell'ossigeno atmosferico (***Microwave Soundings Units - MSUs***), e questa radianza è misurata a diverse frequenze, che descrivono diverse regioni di atmosfera,



(La *vertical weighting function* descrive il contributo relativo della radiazione a microonde emessa da uno strato atmosferico rispetto alla intensità totale misurata nella parte alta della atmosfera).

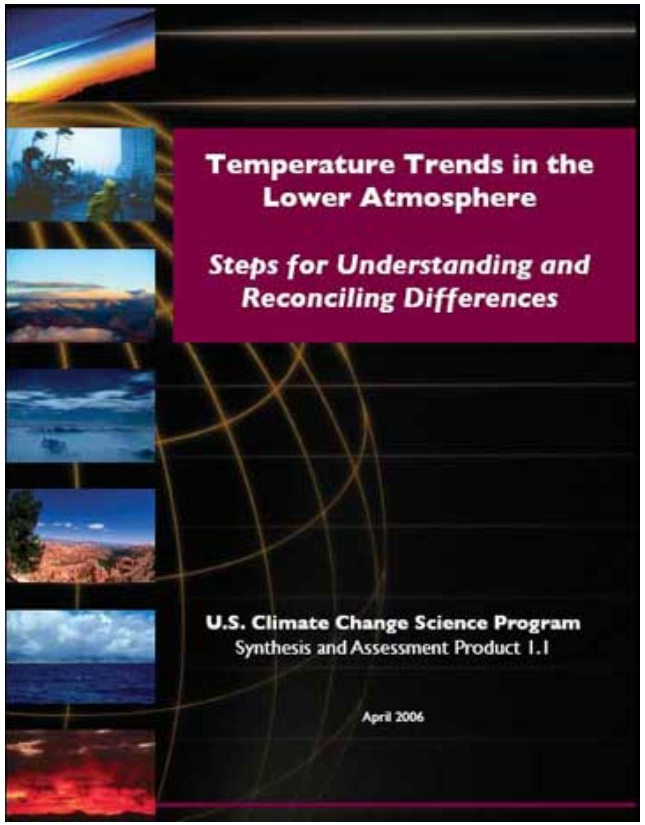
Quindi i **sensori MSU** misurano la *microwave* radianza in **4 canali** (50.3 - 57.95 GHz). Questi 4 canali misurano **la temperatura atmosferica in 4 strati che vanno dalla superficie fino alla stratosfera.**

Il **canale 1** copre fino ad oltre i 10 km di altezza nella troposfera.

Il **canale 2** è largamente rappresentativo di tutta la troposfera, anche se arriva nella bassa stratosfera, quindi misura anche il generale raffreddamento stratosferico.

Il sistema MSU copre tutta la superficie terrestre, a differenza delle stazioni al suolo e delle misure con radiosonde.

Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006.
A Report by the *Climate Change Science Program* and the Subcommittee on Global Change Research, Washington, DC.
"Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences"



EXECUTIVE SUMMARY

Convening Lead Author: Tom M. L. Wigley, NSF NCAR
Lead Authors: V. Ramaswamy, NOAA; J.R. Christy, Univ. of AL in Huntsville; J.R. Lanzante, NOAA; C.A. Mears, Remote Sensing Systems; B.D. Santer, DOE LLNL; C.K. Folland, U.K. Met Office

Abstract

Previously reported discrepancies between the amount of warming near the surface and higher in the atmosphere have been used to challenge the reliability of climate models and the reality of human-induced global warming. Specifically, surface data showed substantial global-average warming, while early versions of satellite and radiosonde data showed little or no warming above the surface. This significant discrepancy no longer exists because errors in the satellite and radiosonde data have been identified and corrected. New data sets have also been developed that do not show such discrepancies.

his Synthesis and Assessment Product is an important revision to the conclusions of earlier reports from the U.S. lational Research Council and the Intergovernmental Panel on Climate Change. For recent decades, all current tmospheric data sets now show global-average warming that is similar to the surface warming. While these data are onsistent with the results from climate models at the global scale, discrepancies in the tropics remain to be resolved. levertheless, the most recent observational and model evidence has increased confidence in our understanding of bserved climatic changes and their causes.

Fonte:
http://www.climatescience.gov/Library/sap/sap1-1/finalreport/sap1-1-final-execsum.pdf

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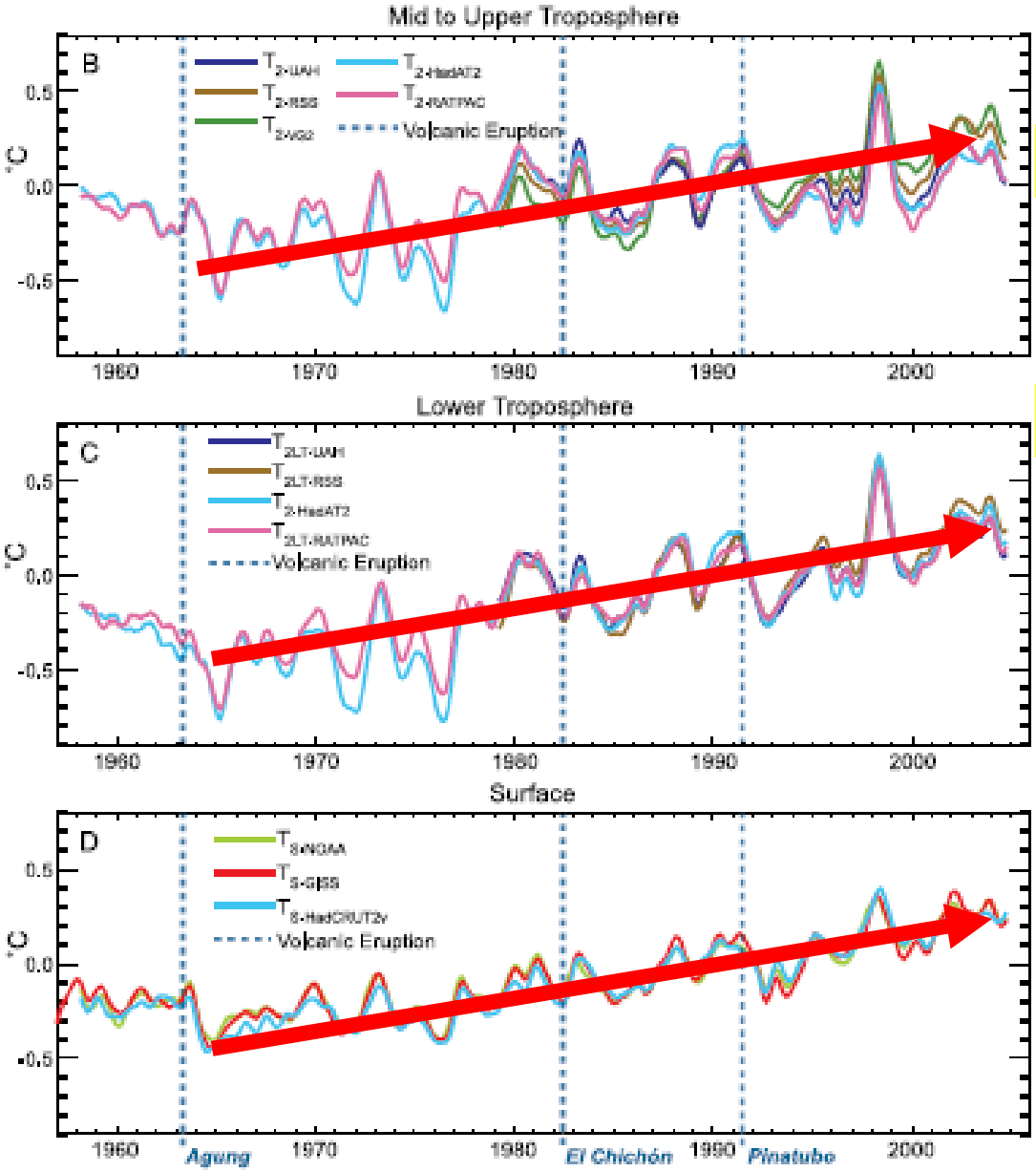
1957 – 2005:
Anomalie medie mensili rispetto alla media 1979-1997



Media – Alta Troposfera (MSU)

Bassa Troposfera (MSU)

Data sources:

- *UAH, RSS, VG2 MSU satellite analyses*
- *UKMO HadAT2 and NOAA RATPAC radiosonde observations*
- *Surface records from NOAA, NASA/GISS and UKMO/CRU (HadCRUT2v).*

Superficie

WGI-AR4-IPCC (2007)

"Niente di strano, nell'Artico il ghiaccio marino si fonde durante tutte le estati …"

"Gli scettici"

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We support research into our world's frozen realms: the snow, ice, glacier, frozen ground, and climate interactions that make up Earth's cryosphere. Scientific data, whether taken in the field or relayed from satellites orbiting Earth, form the foundation for the scientific research that informs the world about our planet and our climate systems.

News

26 August 2008

MEDIA ADVISORY: Arctic sea ice now second-lowest on record

Sea ice extent has fallen below the 2005 minimum, previously the second-lowest extent recorded since the dawn of the satellite era.

13 August 2008

CU Announces Climate Change Symposium

"Meeting the Global Energy and Climate Challenge," August 22 to 23, will focus on climate change science and solutions.

17 June 2008

NASA Science Mission Directorate Seeks Cryospheric Scientist

NASA has announced a search for a Physical Scientist in the Cryospheric Science Program.

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Search

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IPY at NSIDC

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International Polar Year Poster

NSIDC helped produce this poster for IPY. To get your copy, see the IPY poster page.

Arctic Sea Ice News & Analysis

Year-round monthly analysis and daily sea ice images are now available online as the Arctic sea ice melt season unfolds. More

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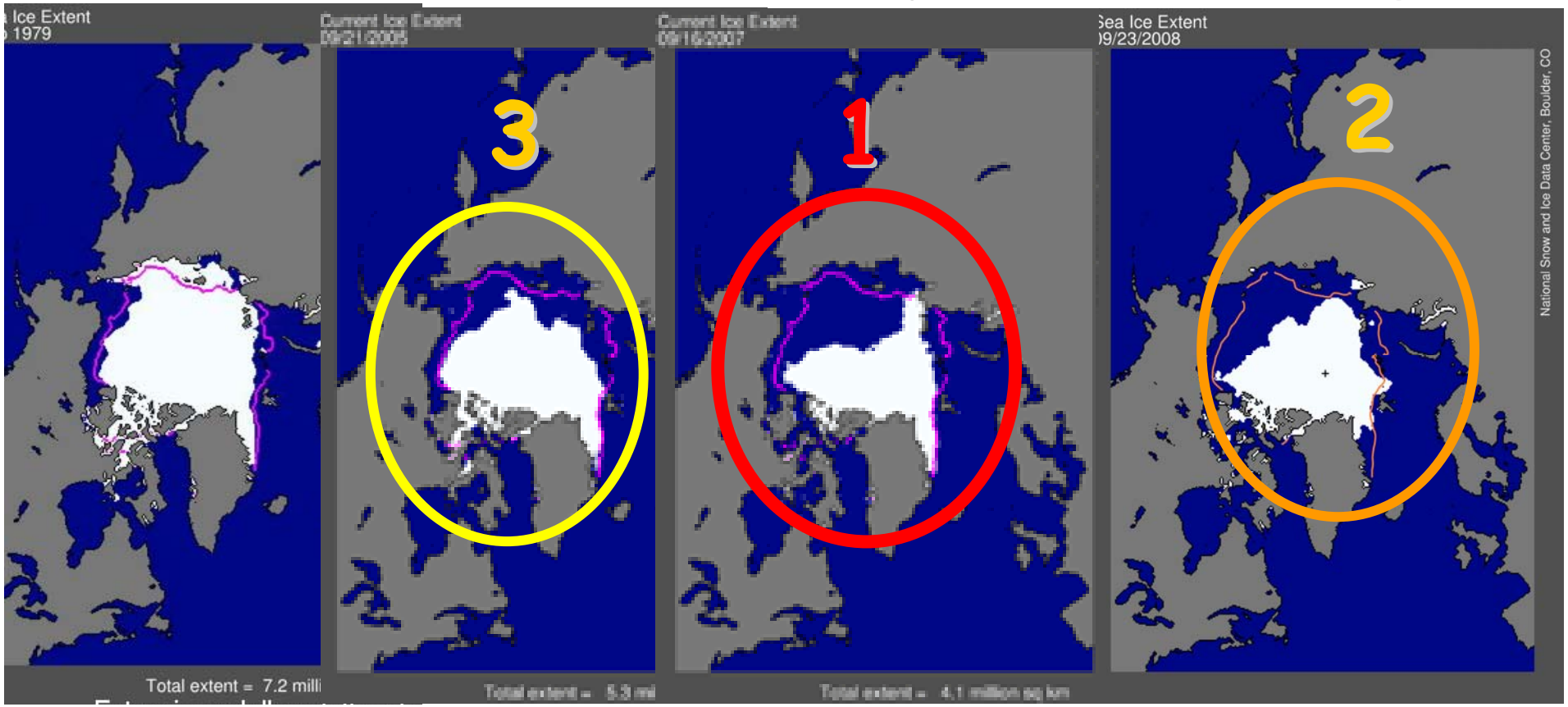
Estensione della calotta Artica:

Settembre 1979	Settembre 2005	Settembre 2007	23 Settembre 2008



La linea rosa indica la estensione di ghiaccio media di Settembre 1979-2000

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Press Room

16 September 2008

Media Advisory: Arctic sea ice reaches lowest extent for 2008

This is a joint announcement with NASA and the University of Colorado at Boulder. The National Snow and Ice Dat Center (NSIDC) is part of the Cooperative Institute for Research in Environmental Sciences at the University of Col at Boulder. NSIDC scientists provide Arctic Sea Ice News & Analysis content, with partial support from NASA.

The Arctic sea ice cover appears to have reached its minimum extent for the year, the second-lowest extent record since the dawn of the satellite era. While slightly above the record-low minimum set in 2007, this season further reinforces the strong negative trend in summertime sea ice extent observed over the past thirty years.

NSIDC will issue a formal press release at the beginning of October with full analysis of the possible causes behin year's low ice conditions, particularly interesting aspects of the melt season, the set up going into the winter growt season ahead, and graphics comparing this year to the long-term record.

Full NSIDC announcement: http://nsidc.org/arcticseaicenews/
NSIDC press office: srenfrow@nsidc.org or +1 303.492.1497

NASA announcement: http://www.nasa.gov/topics/earth/sea_ice_nsidc.html
NASA visualizations: http://svs.gsfc.nasa.gov/goto?3556 and http://svs.gsfc.nasa.gov/goto?3547

Return to Press Room

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Fonte:
NATIONAL SNOW AND ICE DATA CENTER (NSIDC)
http://nsidc.org/arcticseaicenews/

16 settembre 2008

… La copertura del ghiaccio marino Artico sembra che abbia raggiunto la sua estensione minima per l'anno 2008, **la seconda estensione minima dall'inizio della era dei satelliti.**

Leggermente al di sopra del minimo assoluto del 2007, **questa stagione rinforza ulteriormente il TREND NEGATIVO NELLA ESTENSIONE DI GHIACCIO MARINO ESTIVO OSSERVATO NEGLI ULTIMI 30 ANNI.**

Fonte:
NATIONAL SNOW AND ICE DATA CENTER (NSIDC)
http://nsidc.org/arcticseaicenews/