

“GLOBAL WARMING”: MYTH OR REALITY?

THE ACTUAL EVOLUTION OF THE WEATHER DYNAMICS*

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ABSTRACT

The “Global Warming scenario” is a hypothesis derived from theoretical models, asserted but not proven. There are numerous inconsistencies between predictions and actual observed climatic facts. The “global” thermal curve has no real significance in climatic terms. Climatic change is not global, but regional: for example, in the North Atlantic aerological unit, the Western side is cooling while that of the Northeast is warming. The 1970s exhibit a fundamental climatic switch which is not “seen” by the models, but is associated with a gradual increase of violent perturbations and irregularity of weather, linked to a change in the general circulation mode (rapid mode).

Keywords: Greenhouse effect, pollution, global warming, regional evolutions, weather and climate changes, North Atlantic Oscillation (NAO), climatic switch of the 1970s, Mobile Polar Highs (MPHs).

1 INTRODUCTION

Global warming (GW) is a very confusing subject. It jumbles up:

- 1 Pollution and climate: with this latter becoming an alibi – or “scarecrow”.
- 2 Emotions and interests (admitted or hidden): the Earth is in danger and must be saved, but permits to pollute are negotiated.
- 3 Calculations vs realities: theories of models vs real mechanisms of weather; the hypothetical future climate, considered as a postulate – the predictions being all the more speculative as the time span is long (previously 2030, then 2050, and now 2100), vs the evolution of actual weather.
- 4 Sensationalism and scientific gravity, the search for a scoop besides properly justified information, with the media increasing the confusion.

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The debate is undoubtedly dominated and even more so misrepresented, by the fact that GW is a question of climatology when it is in fact treated by non-climatologists as a synonym for pollution, with GW substituted as the moral consequence. The repetition of the IPCC's (Intergovernmental Panel on Climate Change) press statements seems to have been granted adequate qualification to appear to be the conclusions of "climatologists" dogmatically repeating the same stereotyped discourses.

However, there is no lack of specialisms addressing GW, but these competencies are often not related to climatology at all. The argument that IPCC statements have been prepared and agreed by "*hundreds of experts*" must be seriously questioned, for the staff in control of the IPCC is very small. This can be observed in the last draft of its 1996 report with regard to the (supposed) "*discernible human influence on global climate*" (IPCC, 1996). This opinion was added after the event (to "impress" governments), but it does not reflect the opinion of the whole IPCC – far from it. The same was repeated in 2002. The IPCC members agreed among themselves with this critic, for they wrote that: "*Scientists' ability to verify model predictions is often limited by incomplete knowledge of the real climate*" (UNEP-WMO, 2001, inf. sheet 7).

Knowledge of climatology is generally limited, and is essentially based on simple relationships, often prescribed by "*the inevitable simplifications used in the construction of models*" (Le Treut, 1997). But the more the message is simplified, even made simplistic, the greater are the chances for support, particularly by the media. This explains the blind faith in an idealized meteorology. People are generally unaware that this science has faced a true conceptual dilemma for some fifty years, and that meteorology is not yet founded on a general atmospheric circulation model that is able, firstly to translate the reality of meridional exchanges, and secondly to integrate the perturbations. This impasse has, for example, driven the prestigious Miami Hurricane Center to lamentably "miss" the forecast of the trajectory of hurricane Mitch in 1998 (Leroux, 2000). This situation also explains the almost ingenuous trust, the near complete absence of doubt – usually from the self-interested – observed whenever the quality of models and their predictions are evaluated.

The global warming scenario as asserted today is not proven. But, by reason of its "moral" content one must be either for or against it, a choice that is indeed a nonsense from a scientific point of view. In what domain does conviction take the place of knowledge? A reformulation of the GW issue is therefore urgent, and needs to be made carefully and without complacency, strictly devoted to climatology. Pollution is by itself a serious and worrying question, which needs separate treatment.

2 THE GREENHOUSE EFFECT

Greenhouse effect is a reality, and it is pointless to debate that fact. But what is worth questioning is the presumed result of the added, "enhanced", or man-made greenhouse effect. This greenhouse effect scenario is founded on three points:

- that CO₂ and other greenhouse gases (ghg) are accumulating in the atmosphere;
- the hypothetical predictions of the numerical climate models,
- that the hemispherical and global temperature curves, so-called "observed",

confirm the predictions. Of these three points, only one is certain: CO₂ and other ghg rates are indeed increasing, representing a rise of 1.5 % of the 160 W/m² of the natural greenhouse effect. The question is whether human activity is capable of influencing climate on a global scale, and whether, for more than one century, it has already begun to do so. Any answers need first to analyse the relationship between ghgs and temperature.

a. Theoretical relationship between CO₂ and temperature

A question to be asked immediately is what is the actual meaning of the relationship between CO₂ and temperature? Is there a co-variation or a physical correlation? The palaeoclimatic scale is instructive on this subject: a more or less narrow co-variation is observed between CO₂ rate and temperature, but the variations of these two parameters are the result of a cosmic forcing. The common cause is then external to these two variables and clearly signifies that temperature evolution is not dependent upon the CO₂ rate. Consequently, the systematic reference to palaeoclimatology, and particularly to the famous "Vostock curves" (revealing Antarctic climate change for over 400,000 years, i.e. for four Earth orbital eccentricity cycles), is therefore of little significance to this debate.

b. The real relationship between CO₂ and temperature

The relationship between the variations in the CO₂ rate and the "reconstituted" secular global curve of temperatures (cf. fig. 6) is not linear: from 1918 to 1940 a strong warming occurred, of the same order as this one of the last decades, while at the same time the CO₂ rate only progressed by 7 ppmv, from 301 to 308. Between 1940 and 1970 the CO₂ rise was 18 ppmv, from 308 to 326. But temperature had not increased, and publications during the 1970s were even predicting a return to a "little ice age". Only the (presumed) rise of temperature during the 1980s coincides with an increase of the CO₂ rate by more than 22 ppmv. Consequently, the greenhouse effect scenario does not provide a summary of thermal change. Many other factors are involved in this evolution (Leroux, 1996).

c. Water vapour

Firstly, water vapour is responsible for greenhouse effect: from 100 W/m² of the 160 W/m² of the sun's incident radiant energy stored in the atmosphere. That is 63 % of the total, and thus constitutes "*the largest source of uncertainties*" (Keller, 1999). But "*because modelling climate processes involving clouds and rainfall is particularly difficult, the exact size of this crucial feedback remains unknown*" (UNEP-WMO, 2001, inf. sh. 3). Cloudiness brings another uncertainty, the effects being inverse depending on the altitude of clouds.

d. The "urban greenhouse effect"

Like pollution, the supposed global warming could be a mere local phenomenon, especially related to cities. As the observation points measuring temperature are progressively included in the heat dome of cities, they may mainly reflect climatic evolution on a local scale. Goodridge (1996) has showed this for California where it

was observed that: *“the apparent global warming is in reality connected with the loss of heat, which concerns only the urbanized areas”*. In California this rise is also associated with the increase of meridional aerological transfers that come from the South (cf. 5-e below). Similar observations were made in Spain, where Sala and Chiva (1996) even concluded, *“the true ‘natural rise’ of temperature, adjusted for the urbanization effect, may be attributed to the solar activity”*. French measurements also reveal a sustained rise of nocturnal mean minimum temperatures, while the diurnal mean maximum temperatures do not show such a marked trend. This evolution is especially characterized by the negative thermal accidents associated with major volcanic eruptions and much influenced by the spreading of urban heat domes (Veyre, 1999), and also by the North Atlantic aerological dynamics.

It is obvious that any increase in the greenhouse effect is able to act on radiation processes. But, except through the demonstrated influence on urban climate, any consequence at the global scale remains speculative. It is as yet possible only to speculate that temperature will rise. But from when, with what intensity, and with what degree of certainty – all remains unknown.

3 THE PREDICTIONS OF MODELS

The numerical climate models predict a temperature rise. This is considered to be a postulate and thus cannot be questioned. This rise will moreover be “global”, however with different intensities according to latitudes. Nevertheless, many points need to be clarified.

a. Models and warming

Are the models, which are based on radiation, able to predict anything other than a warming? The method used, apart from the sophistication of computations, ultimately applies a simple rule-of-three, taking into account:

- 1 The current rate of carbon dioxide increase in the atmosphere (CO₂ rate)
- 2 The future assumed or ‘projected’ rate, and
- 3 The corresponding temperature.

Such reasoning is “elementary”. But, are models actually required to generate a credible result? Besides, accounting for radiation (except for long-term changes) only allows us to understand that high latitudes are colder than the low ones, and to forecast that winter will be colder than summer. Day to day and year to year temperature variations (and the resulting averages and anomalies), however, firstly depend on the intensity of cold or warm air transported by air streams. Unfortunately, these dynamic factors are not adequately taken into account by the models, and consequently the climatic significance of mean temperature curves remains unquestioned. What is the real significance of a projected range of 1 to 6°C increase by 2100 when more than a century, including the entire industrial revolution – 1860 to 2000, had only (apparently) experienced a presumed rise of 0.6 / 0.8 °C?

b. Simplistic relationships

The modeller’s reasoning is founded on simple, even simplistic, relationships. Such is the case for temperature (as described above), but also for rainfall where the models

predict "*a global rise of precipitation*" by reason of the "*relation between evaporation and surface temperature... a well-established relation, and confirmed by all the models*" (EOS, 1995). However, people pertinently know, firstly that the presence of a precipitable water potential is only one of the conditions required to induce rainfall, the main condition being formed by atmospheric dynamics; and secondly that nowhere is there a direct relationship between the precipitable water potential, and the effectively precipitate water. Similarly, the voluminous IPCC reports are in fact founded on a conjecture that "*if temperature rises, then...*", and on to include other simplistic relationships. This abundant and "impressive" literature thus disseminates mainly fiction, wrongly considered as an applicable, credible prediction.

c. Thermal evolution predicted for the high latitudes

A very hypothetical point is the enormous (presumed) increase of temperature in the high latitudes, which would reach 10 – 12°C, paradoxically during winter of each pole, while at the same time tropical regions would only undergo weak changes. For what physical reasons would the poles warm so much? Does there exist in these latitudes a more intense terrestrial counter-radiation... moreover in *winter*, when at precisely the same time there is no insolation? Is there a larger greenhouse effect, even though water vapour content is smaller, and while cold waters bordering the ice sheets are considerable sinks for CO₂? Is it possible that the supposed temperature rise, which cannot be a result of *in situ* phenomena, will be provoked by an intensification of meridional (N-S) transfers, even though during warm periods these transfers are conversely much weakened, the general circulation thus exhibits a slower mode (Leroux, 1993)? Because cooling had been more vigorous during ice ages in these latitudes, will, conversely, warming now be markedly greater?

Moreover, is all this conflict between observed phenomena and climate forecasts because climatic models are founded on the three-celled general circulation scheme (Le Treut, 1997) and particularly on the assumed existence of a polar cell? This unrealistic and unacceptable three-celled concept does not represent the reality of meridional exchanges: the polar cell does not exist, and as soon as it appeared (1856), Ferrel's scheme was contested and later "officially" rejected in 1950. Even the now popular Hadley cell has only been partially verified. In spite of this "inconceivable" (when one is not a climatologist) state of the art, the scheme used in the numerical models is precisely this three-celled model! The predicted increasing of polar temperatures thus appears to be nothing more than an artefact, a result of the fictional "polar cell"! This critique of the inadequacy of the models is not new: "*Present climate models do not accurately integrate the physical processes that affect the polar regions*" (Kahl et al., 1993), but nothing has changed in the GW community, despite the key importance of high latitudes in the forcing of general circulation. The explanation of the IPCC "experts" is as follows: "*The reason is that snow and ice reflect sunlight, so less snow means more heat is absorbed from the sun, which enhances any warming...*" and thus "*by the year 2100, parts of northern Canada and Siberia are predicted to warm by up to 10°C in winter...*" (UNEP-WMO, 2001, inf. sh. 5). It is merely a question of the polar winter sun. Hardly!

d. Actual thermal evolution in high latitudes

The actual thermal evolution in high latitudes is not the one predicted by models. Over Antarctica there is no change, the observed temperatures curves (Daly, 2001), do not show any trend, while satellite observations (1979–1999) show a lengthening of the sea ice season over large areas around Antarctica (Parkinson, 2002). In contrast, the western Arctic is cooling, providing the most flagrant denial to the models' predictions: cooling reached 4 to 5°C (–4.4°C in winter, and –4.9°C in autumn) during the period 1940–1990 (Kahl et al., 1993). This trend in surface and in lower layers is confirmed by as marked a warming in the 850–700 hPa layers (+3.74 °C, between 1,500 and 3,000 m), which indicates that the resulting intensification of air streams came from the South, over the cold lower level anticyclones, the MPHs (Mobile Polar Highs). Rigor et al. (2000) show the downward trend from 1979 to 1997 over the Beaufort Sea and eastern Siberia, extending into Alaska, during autumn (1°C / decade) and winter (2°C / decade). Because of the dominant role played by high latitudes in the general circulation, this Arctic cooling and particularly of its western side, which is the starting point of a majority of MPHs, is a key fact in the northern hemisphere. This is absolutely ignored by the models.

e. Mildness or storminess of weather?

Models at first and logically predicted milder weather: *“Storms in middle latitudes... result from the temperature difference between pole and equator... this range will decrease with warm conditions... consequently storms will be weaker”* (IPCC, 1990; Météo-France, 1992). Météo-France confirms this again:

“climate change, as simulated by numerical models, generally involves a North-South temperature gradient reduction in the lower layers of atmosphere... its effect is a lessening of the atmospheric variability connected to the lows, because instabilities, particularly over the North-Atlantic area, are strongly governed by the temperature gradient intensity” (Planton and Bessemoulin, 2000).

A warming must therefore be accompanied by less vigorous MPHs, a slowing down of meridional exchanges of air and energy (slow general circulation mode) and in the polar and temperate latitudes by lessened thermal contrast between air streams. As shown by the lower severity of summer weather (compared to the wintertime), models are not necessary to infer such a state (Leroux, 1993). Yet a “warm” scenario announces an enhanced mildness of weather, which is not however what we can actually observe, the weather itself is refuting these predictions.

Is opportunism the only reason for announcing, today, exactly the contrary of former conclusions? Catastrophic predictions, with the media as amplifying sound box, are now in vogue without any surprise expressed concerning this reversal in ‘prediction’. Models are thus presented sometimes as arguments, sometimes as alibis. Are they able to predict such an evolution as well? According to IPCC:

“The frequency and intensity of extreme weather events such as storms and hurricanes may change. However, models still cannot predict how. The models used to simulate climate change cannot themselves simulate these extreme weather events...” (UNEP-WMO, 2001, inf. sh. 5).

What scientific argument allows some people to say that the weather patterns “may

change" (this is nothing but a truism), if the models are not capable to predict?

Opinions still differ diametrically. For example, it may happen that

"the North-South pressure gradient would even increase. The famous "North-Atlantic oscillation" would, under the influence of an increased greenhouse effect, show a more and more positive index". (Le Treut H., in Science et Avenir, 2000, p. 82)

This is, indeed, exactly contrary to real phenomena, (see below 5c):

"Such an evolution will favour new generations of storms... that is one of our strong research hypotheses" (Le Treut, LMD, in Science et Avenir, 2000, p. 82).

However, nobody is unaware that the *North-Atlantic oscillation* index is markedly higher in winter (cf. fig. 3), and that in temperate latitudes (schematically), that the "bad weather" is connected with the "cold" and that the more intense storms occur in winter. But this is now, strangely, attributed to "warming"!

f. The ability of models to predict climate

Models are unable to forecast weather more than 2 to 3 days in advance. Beyond this, the coefficient of confidence is no more than 3/5 or 2/5 that is to say a little more or less than 1/2. Said differently, one chance to two. Is this still a forecast? How then is it possible to predict the future climate taking into account that *"climate is simulated with the same models than these ones used to forecast weather... or at least with the same methods"* (Rochas and Javelle, 1993). Models that are unable to reconstitute the climatic change of the last century, and would now claim to predict the climate by 2100! Can this be meant seriously? Are the predictions credible? What can we make of assertions such as:

"Increasing of temperatures will strengthen the hydrological cycle, from which a risk of worsening of droughts and/or floods over some places and a possibility of an attenuation of these phenomena over other places" (IPCC, 1996, p. 23)?

What confidence can we have in the prediction, repeated in 2001:

"Total precipitation is predicted to increase, but at the local level trends are much less certain... even the sign of the global change of the soil moisture – whether there will be an increase or a decrease – is uncertain" (UNEP-WMO, 2001, inf. sh. 5)?

When these same models are extended to 2100, it becomes necessary to take into consideration the reservations made by the modellers themselves:

"uncertainties remain still high... changes associated with different parametrisations are of the same scale of sizes than the errors of model" (Beniston et al., 1997), and thus *"the accumulation of these factors of uncertainty makes it undoubtedly illusory, for the moment, to make detailed prediction of the future evolution of climate"* (Le Treut, 1997).

In summary, predictions of models are wrongly considered to be the idealized fruit of a successful meteorological science. However, they impress only those who are not climatologically experienced, for they assume an agreed modelisation of meteorological phenomena and a perfectly understood general circulation. However, such suppositions are far from true. In fact, the predictions themselves highlight the inconsistencies and the flaws of a meteorological science that suffers from conceptual

failure. It remains wrapped up in its old dogmas (but probably no more than any other science), and is therefore in need to assert claims for what is not yet possible to predict.

4 THE MYTH OF THE ‘VALIDATION’ OF PREDICTIONS

“There is evidence that climate change has already begun” (UNEP-WMO, 2001, inf. sh. 2). Thus claims the IPCC and adds: *“the pattern of temperature trends over the past few decades [resembles] the pattern of greenhouse warming predicted by models”*.

The temperature curve, reconstituted (sic) from observations, i.e. averaged on a global or hemispheric scale, seems to confirm the models’ predictions, with an increase of 0.6°C since 1860 (but with an uncertainty of more or less 0.2°C). What can one say about this “confirmation”, and what is the actual significance in terms of climate of this “official” curve?

a. Invalidation by satellites

The rise of the last decades of the “reconstituted” curve, of more than 0.3°C, is not confirmed by satellites, particularly by those of NOAA from January 1979 to January 2000 (Daly, 2001). The four sets of measurements show the same light fluctuations from year to year (Gray, 2001), and in spite of a greater accuracy than the surface data, are not detecting any appreciable evolution. Observations by satellites have been criticized (by GW followers), especially their ability to account for the surface temperature. But these measurements during this period show the solar cycles (no. 22 and 23) very clearly, and the cooling in 1992 connected with the Pinatubo eruption.

b. Comparison of the 1931–1960 and 1961–1990 Normals

Litynski (2000) compares the 1931–1960 and 1961–1990 Climatological Normals (OMM, 1971 and 1996). The first period corresponds to the *contemporary climatic optimum*, and the second contains the highest supposed rise of temperature: such a comparison is therefore very impressive. Litynski shows clearly that *“there is no global warming during the 1961–1990 period”* but that we can observe, at the regional scale, coolings as well as warmings. In the northern hemisphere, for example, the fall of temperature is of the order of: –0.40°C over Northern America, –0.35°C over Northern Europe, –0.70°C over the northern part of Asia, and reaches –1.1°C in the Nile Valley area. But other regions are warming: for example, the western side of North America (from Alaska to California), or Ukraine and the South of Russia. Models have neither forecast, revealed, nor explained these regional disparities.

c. Global change or regional changes?

Models dictate the notion of a ‘global’ climate evolution... as if a *global climate* could ever correspond to a reality. The statement of IPCC (1996) is symptomatic:

“regional values of temperatures would be appreciably different [from] the global average, but it is not yet possible to determine these fluctuations with precision”.

Such an approach would signify that the average value is indeed known before the local and/or regional values are considered, which in turn would allow this ‘global

average' to be computed. Moreover, is it pertinent to repeat, as does the IPCC, that: *"it is still too early to predict the size and timing of climate change in specific regions... predicting how climate change will affect the weather in a particular region is much more difficult..."* (UNEP-WMO, 2001, inf. sh. 2).

Are these previous statements not more than enough? Given that it is more than adequate to observe (cf. below: Section 5) the various regional evolutions? What is the real climatic significance of the *reconstituted* temperature curves? What is the representative trend? Is this one of the regions where the trend is rising or falling? Any hemispheric or – *a fortiori* – global mean has only a statistical basis, of dubious value, i.e., it is self-evident that such means have no real significance in term of climate.

d. Other contradictions with predictions

Refuted by the temperature change, the GW scenario is again denied by the evolution of precipitation, surface pressure, and actual meteorological facts. Weather is not becoming milder, but on the contrary more violent, recent disasters confirming an increase of paroxysmic events. Comby (1998), for example, has shown that in 40% to 50 % of RhÔne Valley stations, rainfall of high intensity has increased during the 1950–1997 period. Similarly, the periods' rainfall conditions have not improved over the Sub-Saharan Africa, where palaeoclimatology has clearly proven that warm periods were always auspicious periods enjoying abundant rains (Leroux, 2001). The enhanced frequency of *El Niño* events, as well as the real climatic evolution since the 1970s (cf. 5-d), also highlight the gap between hypothetical predictions and observed facts (Leroux, 2000).

e. No single climatic parameter is able to change in isolation

Temperature alone cannot change as other variables. That is evident, and the overall climatic evolution should be considered as an integration of all parameters which define weather. Thus, for example, in France:

- 1 For the whole country, mean temperature reveals a recent rise, but for stations close to the Atlantic coast this rise is most pronounced, due to the intensification of warm air coming from the South. In contrast, inland stations located within the meridional path of MPHs experienced a limited cooling (Leroux, 1997).
- 2 Precipitation does not show a clear evolution, increases and decreases are registered in recent decades according to local precipitation conditions (Schmitter, 1995) linked to the dynamics of air transfers.
- 3 Surface atmospheric pressure shows a recent general, sustained and regular rise over the whole of Western and Central Europe.

Which of the above parameters is the pertinent one? The rising pressure appears paradoxical and contrary to the slight observed warming. Thus it reflects the intervention of a dynamic factor which remains to be characterized. Generally speaking the dynamics of weather depends on only a few processes that are not defined (from) local conditions, especially for intense events, which need very strong transfers of precipitable water (potential) over a long distance. Such transfers are organised in our latitudes by MPHs (Mobile Polar Highs) which themselves are of distant origin.

In summary, the GW claim is unconvincing and often incoherent. The “models”, far from enlightening us on climatic change, increase confusion because they implicitly underline meteorological deficiencies and contradictions. The predictions of models remain unconfirmed and nothing has yet proved that general GW has already begun. The emphasis of models on the man-made greenhouse effect excludes other possible causes: water vapour, cloudiness, atmospheric turbidity, solar activity, volcanism, urbanization, orbital parameters or even the stream of cosmic rays, and – this is the factor explored here, meridional exchange dynamics (Leroux, 1996).

As long as IPCC's message was confined to a warming prediction, it remained in a hypothetical domain and was in fact credible with regard to general principles of physics, even if this was not the case for the actual details of the distribution of temperatures. But as the IPCC now claims that climate change is already a reality, it actually only refers to weather events and observable facts. The deficiencies in climatology are thereby emphasized and comparisons between assumptions and reality then become “verifiable”. Such a test does not, however, turn out to be to the IPCC's advantage. In the case of the Northern Hemisphere where a careful climatological analysis reveals a significant climate change during the last century and especially the climatic switch of the 1970s. The models do not indicate such an evolution. Let us look first into the North Atlantic areological unit as an example.

5 THE RECENT WEATHER CHANGE IN THE NORTH ATLANTIC UNIT

In the North Atlantic areological unit, the climatic parameters co-vary because they obey the same dynamics. Atlantic Basin aerology, or the motion of the atmosphere, is governed by the MPHs that are born over the Arctic Ocean (mainly over its western side) and are continually injected into the lower levels of northern hemisphere circulation. They transport cold air and in turn provoke a poleward advection of warm air, in a cyclonic air stream ahead and above MPHs (Leroux, 1996). The evolution of climate varies by region – and subregional microclimates.

A. Western and central regions of the Atlantic unit

The Arctic basin, after a rapid warming until 1930–1940, is now slowly cooling in all seasons (Rogers, 1989, fig. 1), especially over the Western Arctic (Kahl et al., 1993; Rigor et al., 2000). Falling temperatures have repercussions over Greenland and Canada (Gullett and Skinner, 1992; Morgan et al., 1993; WMO, 1998; Litynski, 2000; Daly, 2001), particularly in Eastern Canada where cooling records are constantly breached. Figure 1 clearly reveals the *contemporary climatic optimum* of the years 1930–1960, and continuous cooling since the 1970s. Central and Eastern parts of the United States, up to the Gulf of Mexico, also observe a marked cooling trend (Kukla, 1989; Litynski, 2000). Cold waves induced by enormous and high pressure MPHs which reach the Gulf of Mexico and were not too severe during the 1950s, have become very much worse since the 1970s (Michaels, 1992). Cooling is spreading over the larger part of the Atlantic Ocean, from Greenland up to Europe, and further south (Gordon et al., 1992), in the air as well as in ocean (Folland et al., 1990). In winter, Deser and Blackmon (1993) observed “a warming from 1920 to 1950, and a cooling from 1950 to nowadays”, as well as a coincidence between “colder than normal sea-

surface temperatures and stronger than normal winds”, up to the shore of Western Africa (Nouaceur, 1999; Sagna, 2001).

b. Northeastern area of the Atlantic unit

The northeastern part of the Atlantic Ocean experiences an particular evolution along the more frequently used American-Atlantic path of MPHs (the more frequently used) which includes the location of the statistical, so-called “Icelandic” low, as well as the less frequent direct descents of MPHs (via the Norwegian Sea). This evolution includes:

- An increase in temperature which reached 3°C during the last three decades on the annual mean value scale, the highest rise being observed in winter season (Reynaud, 1994); which confirms its dynamic character.
- A continuous increase in precipitation, which induces a gain in the mass of the Greenlandic, Icelandic and Scandinavian glaciers (WMO, 1998). This gain is very rarely mentioned by the media, while the thinning of sea ice over the Norwegian and Barents Seas is always much emphasized.
- A continuous fall of pressure, with the more marked fall being observed in winter (Reynaud, 1994). Again, this confirms the dynamic character of this change.

These changes spread more or less over the whole of Western Europe, with a separate circulation unit spreading eastwards (cf. fig. 3).

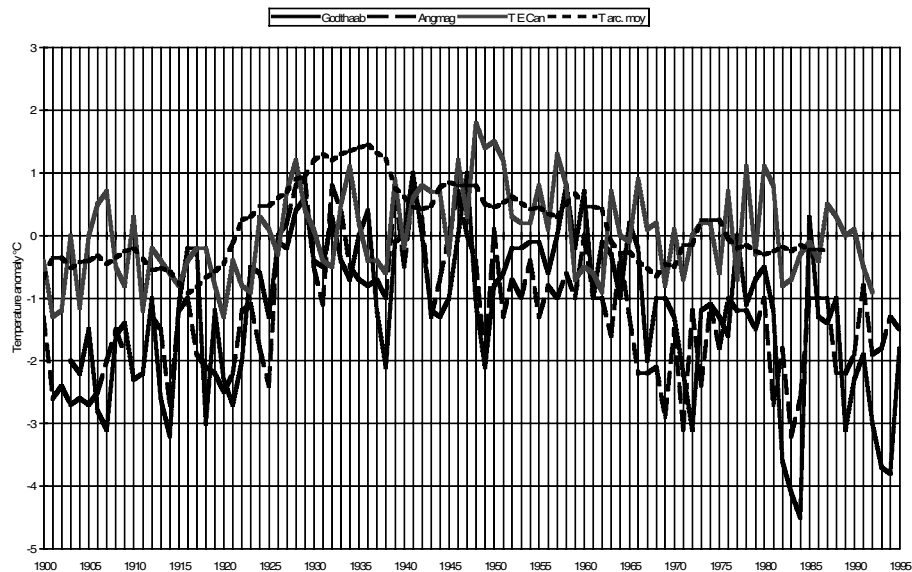


Figure 1. Evolution of the mean temperature, in the Atlantic Arctic from 1900 to 1987 (T arc. moy), established with the seasonal values (after Rogers, 1989), in eastern Canada (T E Can), from 1900 to 1992 (after Morgan et al., 1993), at Godthaab (Nuuk, 64.2 °N – 51.7 °W – 20 m), and at Angmagssalik (65.6 °N – 37.6 °W – 35 m), Greenland, from 1900 to 1995 (after Daly, 2001)

Thus, cooling is observed along the trajectory of MPHs, while warming characterizes the regions located on the outside of their main path. These warming regions have the advantage of increased warm and wet advection of air originating in the South and forced on from the front by more powerful MPHs. Similarly, the North-Atlantic Drift which is a continuation of the Gulf Stream, is accelerated by more intense atmospheric transfers which brings more warm water towards the Norwegian Sea and even the Barents Sea. This induces a melting and a thinning of the peripheral sea ice as it is warmed from above by air and from below by seawater.

c. The North-Atlantic Oscillation (NAO)

Weather over the North-Atlantic area and Europe is classically connected to the North-Atlantic Oscillation (NAO). For about 80 years, NAO has been defined by an index (fig. 2) which represents the pressure difference between the so-called *anticyclone from the Azores*, and the so-called *low from Iceland*. It is necessary to underline that these 'centres of action' have been defined at the average (statistical) scale and are unable to qualify as phenomena occurring at the synoptic scale, precisely because the scale of the actual weather (Leroux, 1996). NAO has a positive mode when pressure is higher in the *anticyclone* (and is negative mode when the opposite is true), that is the *low* is very pronounced (and conversely). These, positive and negative modes establish co-variations, but they do not explain them. The 'normal' or 'usual' (the common) cause (i.e. MPH dynamics) is not specified by classical theories. This is attested by Hurrell et al. (2001):

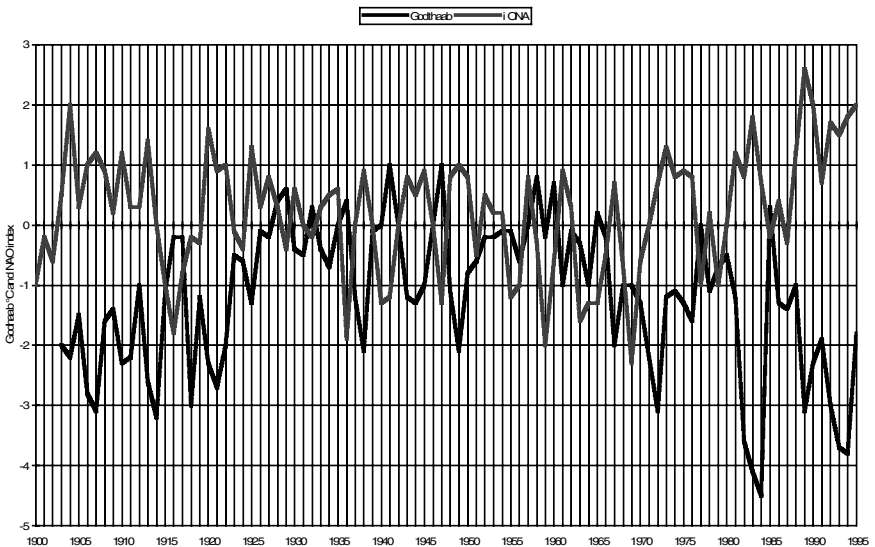


Figure 2. Evolution of the mean temperature at Godthaab, Greenland (after Daly, 2001), and of the index of North Atlantic Oscillation, i NAO (= i ONA) (after Wanner, 1999), from 1900 to 1995

"Many things remain to be known about NAO..., forcing can occur from stratosphere, ocean, or other not yet identified processes".

In fact, conventional concepts know nothing whatever about the true origin of the 'anticyclone', i.e. the anti-cyclonic agglutination made by the merging of MPHs, about the "lows" connected with MPHs, i.e. the mechanisms of the 'North-Atlantic pendulum', and also about the reasons for these modes changes. They thus remain unexplained:

"How and why does [the] NAO see-saw from one mode to an other?... despite many studies this question remains open and the mechanism of the flip flop quite mysterious" (Wanner, 1999).

However, MPHs dynamics provides a clear answer to the alleged NAO enigma: the intensity of cyclonic northwards transfer of warm air, particularly on the front of MPHs, the deepening of the peripheral low pressure corridor and of the closed low (depression or cyclone) are all functions of the power of the MPHs, which are themselves initially governed by the polar thermal deficit. The NAO index (fig. 2) then becomes an indicator of the strength of MPHs and of the intensity of meridional exchanges; that is – of the modes of general circulation.

The following mechanisms are easily verified on synoptic, seasonal, statistical (mean) and even palaeoclimatic scales (Leroux, 1993, 1996, 1998; Pommier, 2001):

- *Negative or low phase of NAO (fig. 3-1)*

During the Negative Phase weak pressure differences prevail between AA

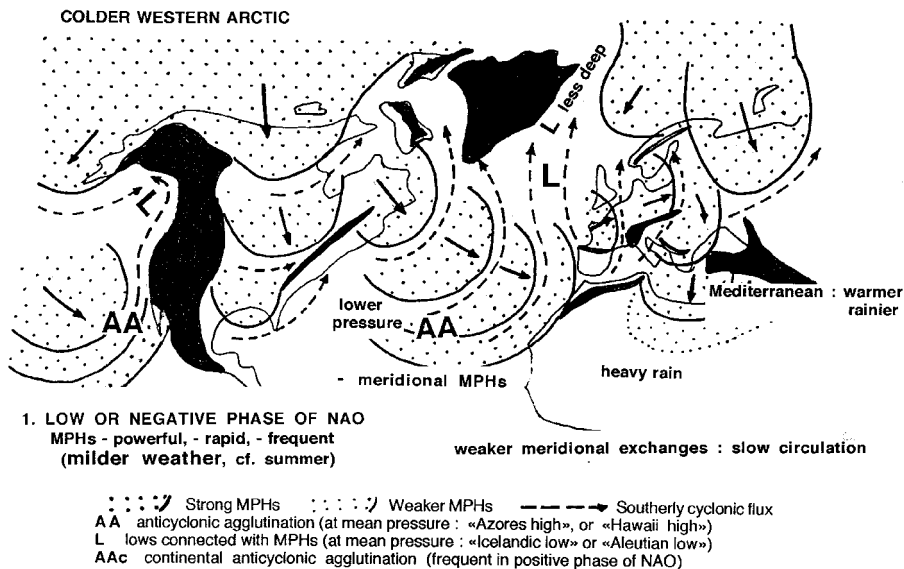


Figure 3.1. Dynamics of MPHs in the aerological units of North Pacific, of North Atlantic – Western Europe and of Central Europe – Mediterranean – Northern Africa: 1. during a low phase (negative index) of NAO

(anticyclonic agglutination) and D (depression or low). The Arctic area is relatively less cold, MPHs are less powerful, less frequent, and their path is less meridional. As a result, at the average scale (statistical), the anti-cyclonic agglutination (AA *from the Azores*) is weaker, less extended and displaced northwards. The synoptic lows connected to the MPHs are less deep, and as a result on the statistical (average) scale the low from *Iceland* is less deep and less extended. The meridional exchanges are slackened, in the air as in the ocean (slow general circulation mode). Weather is milder and the thermal contrasts are attenuated. The *mean* (average) temperature of the aerological unit where contrasts between western and eastern sides are less pronounced, and, all things considered, is most *representative* of reality. Over Europe and the Mediterranean anti-cyclonic agglutinations are less frequent and short-lived. Over Subsaharan Africa the summer rains are more abundant, with the rainmaking structures being displaced northwards (Leroux, 1995, 2001). Another pattern of

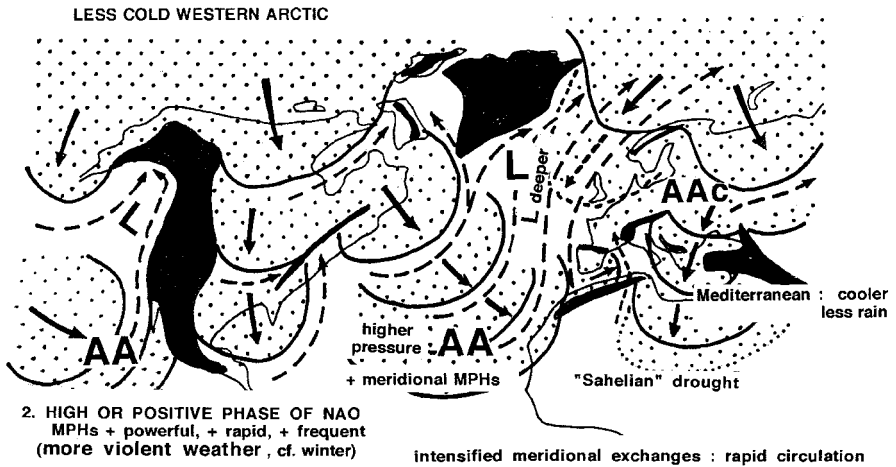


Figure 3.2. Dynamics of MPHs in the aerological units of North Pacific, of North Atlantic – Western Europe and of Central Europe – Mediterranean – Northern Africa: 2. during a high phase (positive index) of NAO (NAO: North Atlantic Oscillation). The North Atlantic unit communicates weakly westwards with the North Pacific unit (only at the northern and southern extremities of the Rocky Mountains barrier), and easily eastwards with the Europe-Mediterranean-North Africa unit. Another unit spreads eastwards, across the Urals, across Asia, north of the Himalaya-Tibet barrier. These units of the northern hemisphere have in common that they are moved by MPHs born over the Arctic basin.

negative NAO may occur when the MPHs descending east of Greenland, via the Norwegian Sea and Scandinavia, are abnormally numerous, i.e. containing more than about 1/4 of the MPHs paths. The average pressure of the Icelandic low area is lower, thus reducing the pressure difference between AA and D. This pattern has a low frequency, however.

- *Positive or high phase of NAO (fig. 3-2)*

The high pressure difference between AA and D. The Arctic is colder. MPHs are initially more powerful, more frequent, and their paths are more meridional. As a result, on the mean scale, the Atlantic anti-cyclonic agglutination (Azores High) has a higher pressure, is more extended and displaced southwards. Synoptic lows forced by strengthened MPHs are deeper, and as a result (on the mean scale) the depression (Icelandic Low) is also deeper and more extended. Meridional exchanges are strengthened in the air as in the ocean (rapid general circulation mode). Weather is more violent: thermal contrasts are higher. The average temperature of the aerological unit (where contrasts between western and eastern sides are strongly pronounced) has therefore no climatic significance. Over Europe (AAc) and the Mediterranean the anti-cyclonic agglutinations are more frequent and long-lived. Over Sub-Saharan Africa summer rains are less abundant with the northern edge (the Sahel) suffering drought and the rainmaking structures displaced southwards (Leroux, 1995, 2001). It must be stressed that a positive phase of NAO is completely inconsistent with a global warming scenario.

d. Weather increasingly more violent since the 1970s

The 1970s represent a true climatic switch, leading to growing contrasts between the two sides of the Atlantic Ocean. Thus, concerning the NAO,

"since 1974 the positive mode is preponderant" (Wanner, 1999)

Figure 2 eloquently highlights the co-variation between the falling temperature over the Arctic and along the path of MPHs, on the one hand, while on the other there is the rise in the NAO index (fig. 3-2), and inversely (fig. 3-1). All parameters co-vary: temperature is falling over Greenland, but is rising over the Norwegian Sea, surface pressure is increasing at Lisbon (fig. 4), while falling at Trömso and Reykjavik.

At the same time rainfall is increasing all around the Norwegian Sea, but decreasing over the southern part of the Sahara. In this way, rainfall declining over the Sahel but increasing over Iceland (cf. Leroux, 1996). It would be very hazardous (just as doing the statistical analysis) to therefore evoke some *correlations* or *causal relations* between pressure and rainfall, or between surface temperature (in air or water) and rainfall, because the dynamic common cause of the *co-variations* is external to these parameters. The continuous rise of the NAO index during the last three decades is connected with a fall of the Arctic temperature (Kahl et al, 1993) and with a resulting increase in the frequency of powerful mobile anticyclones originating from the Arctic basin (Serreze et al., 1993). This clearly signifies that meridional exchanges have been strengthening since the 1970s, which correspond to a rapid mode of the general circulation and to more severe confrontations on the frontal face of MPHs (fig. 3-2). These are exactly the inverse conditions from those that would need to be applied using a GW scenario.

Over North America the frequency of violent perturbations, blizzards and tornadoes, has strongly increased with more numerous intrusions of cold air. These dramatic events, like the “*Blizzard of the century*” in March 1993 (Forbes et al., 1993), or like the “*Grand Verglas*” (“*the Great Ice Storm*”) in January 1998 (Abley M., 1998), demonstrate a continuous increase in the frequency of violent storms since 1965, in connection with a rise of the number of deep lows in the Great Lakes basin (Davis et al., 1993; Kunkel et al., 1999). Tornadoes are generated ahead of powerful MPHs, by the clashing contact of cold air coming from the North with the warm and wet air brought by the trade winds via the Gulf of Mexico. Air thus becomes more unstable over the continent. The number of tornadoes rose strongly between 1953–1995 (WMO, 1998).

Over the North Atlantic the continuous strengthening of MPHs is in turn responsible for a northwards transfer of tropical heat and energy, and for the generation of deep lows, that is the “cyclones” with a pressure below 950 hPa, a value which characterizes high intensity winter storms. These increased remarkably between 1956 and 1998, their number recently multiplying by about three (WMO, 1999) with the area affected by these storms spreading widely to the countries bordering the northeastern Atlantic. In this context, the “*lowest pressure value ever recorded in this region*” (Mansfield, 1993; WMO, 1994), less than 915 hPa, was registered on 10 January 1993 off the western shore of Scotland during the *Braer storm*. This might be considered to have been a kind of harbinger of the December 1999 storms. This trend

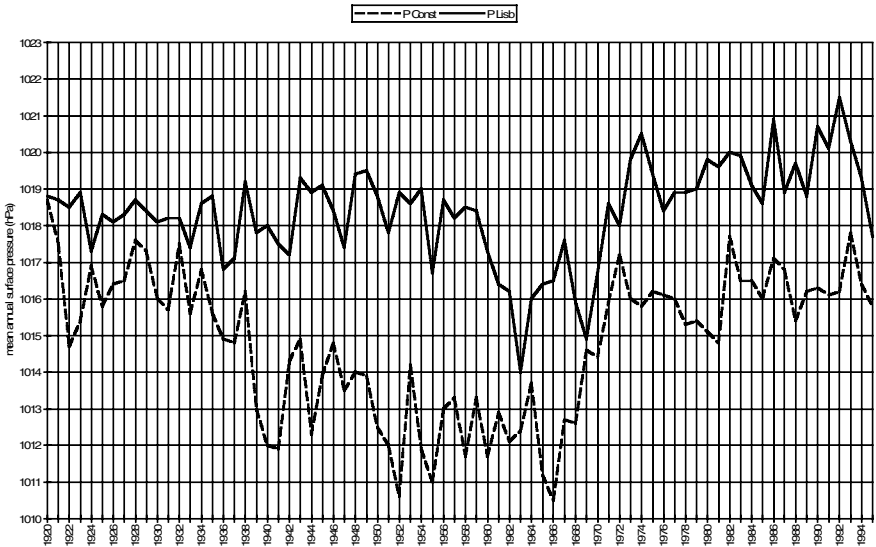


Figure 4. Evolution of surface pressure: at Lisbon (P Lisb), Portugal (after data from the Portuguese Meteorological Service) from 1920 to 1995, and at Constantza (P Const), Rumania (after data from the Rumanian Meteorological Service), from 1920 to 1995

also shows up in the gradual augmentation of the height of the waves in the North Atlantic Ocean (Bouws et al., 1996). The results of the WASA European Project (1998) are unequivocal:

"The main conclusion is that the storm and wave climate in most of the northeast Atlantic and in the North Sea... has indeed roughened in recent decades".

As shown in figure 5, the storm index is remarkably well modelled on the evolution of the NAO index, with the more recent values being the highest of the century.

This evolution is the opposite to that of the thermal evolution in high latitudes (fig. 1 et 2), with the middle of the century having been milder. Storms over the French Atlantic shore, but also over the British Isles, have become more and more frequent and intense (Lemasson and Regnaud, 1997), and are responsible over Brittany for *"a rise of the frequency of strong and storm winds since the 1970s"* (Audran, 1998, pers. com.). Warm and wet southwesterly winds are intensified in front side of MPHs, which then enhances the frequency of rainmaking conditions and may be accompanied by repeated flooding, with rainfall and temperature following the same upward evolution.

This intensification of meridional exchanges and particularly the increasing strength of MPHs in time is undoubtedly shown in the continuous strong upward trend of the surface pressure along the MPHs' main trajectory. Such a trend is contradictory to warming, if this latter is considered as a cause – warm air being light – but is inversely logical if considered the result of an increase of pressure. Thus, the low

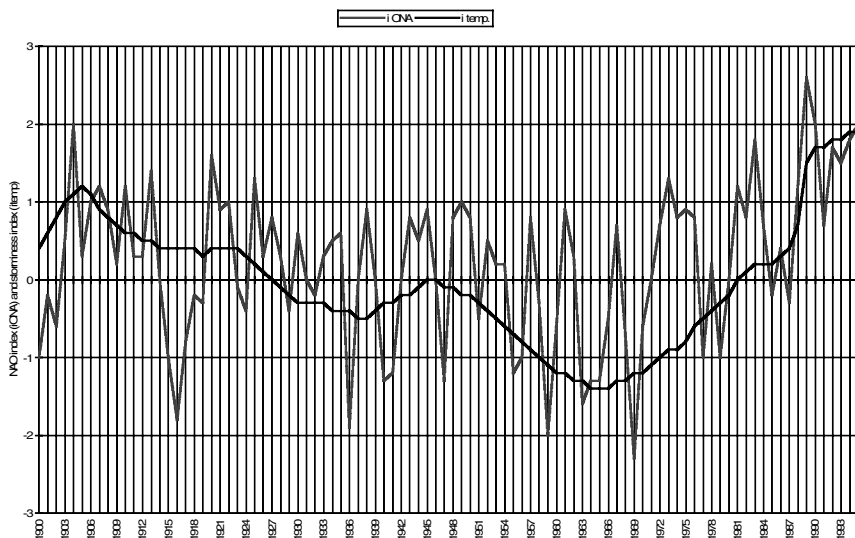


Figure 5. Evolution of the storm index (i temp. = index of tempestuosity) over the British Isles, the North Sea and the Norwegian Sea (after The WASA Group, 1998), and of the NAO index (i NAO = i ONA), from 1900 to 1995 (after Wanner, 1999)

pressure level regions “*must cause rising temperatures*” (H. Thieme, pers. com.), a simple consequence of the thermodynamic characteristics of gases as high pressure favours molecular conduction. Such an evolution of pressure is observed over North America and specially over Eastern Canada (Gachon, 1994), over the North Atlantic Ocean (Flohn, 1990; Trenberth, 1991; Leroux, 1995; Sagna, 2001; with fig. 4 showing this pronounced increase since the 1970s). There is one obvious exception, over the Norwegian Sea (fig. 3-2) which in contrast experienced a simultaneous fall in pressure (Reynaud, 1994). The upward pressure trend spread over the whole Western Europe (at Bern it is above 3 hPa), over the Mediterranean (Leroux, 1996), and over Northern Africa where it contributes to a strengthening of the trade winds and to displacement of precipitation structures southwards (Leroux, 1995, 2001).

e. Other circulation units of the northern hemisphere

This weather change, which is exactly inverse to that of a GW scenario, offers an additional disappointment to model predictions as confirmed in the two contiguous aerological units (fig. 3).

In the North Pacific unit, MPHs are coming from Asia or directly via the Bering Strait. The southerly advection is vigorously channelled northwards, moving towards Alaska, between the front of MPHs and the relief of the Rocky Mountains. The MPHs are finally stopped when they encounter the North-South relief, which acts as a decisive interference to the formation of the so-called anticyclonic agglutination from Hawaii (or California). The superficial ocean water is channelled northwards (“warm” current of Alaska), or southwards (“cold” or “cool” current of California). The recent evolution is more or less the same than this one observed in the Northern Atlantic, the North Pacific Oscillation index following roughly the same trend as the NAO (Favre, 2001). Around the location of the so-called Aleutian mean depression, a warming is observed (Morgan and Pocklington, 1995) in the air and in the surface water, the Alaska current being intensified. Southern Alaska, where only the accelerated southerly air stream is allowed to ascend the vigorous relief, then records

“the highest surface temperature [increases] of the whole northern hemisphere”
(Trenberth, 1991).

This induces a melting of (some) South facing glaciers (Pfeffer et al., 2000). In 1998 the continuation of intense northwards transfers of warm seawater raised the surface temperature from 2°C above normal (Hunt et al., 1999), with the same consequence as in the Barents Sea, namely to reduce the depth of sea ice.

Rainfall has also strongly increased, while pressure has declined on both the synoptic and mean scales (Gloersen, 1995; Gershunov et al., 1999). Further to the South, the upward pressure trend is high in the anticyclonic agglutination (from Hawaii), which is also displaced southwards, with the Western and Central Pacific being cooled (Gershunov et al., 1999). The temperate cyclonic activity “*has remarkably increased*”, the frequency of deep lows has risen by about 50% and the lowest central pressure has declined from 4 to 5 hPa. The related extreme winds and vorticity have correlatively been augmented by 10 to 15% (Graham and Diaz, 2001). Besides, perturbations were displaced southwards with storms becoming more frequent (and floods over California). As in the North Atlantic, with these increased

surface winds, the height of waves has also increased (Allan and Komar, 2000).

In Scandinavia begins another circulation unit (fig. 3), the *Scandinavian* and *Russian* MPHs which propagate cold Arctic air and an upward pressure trend towards the Balkans and the Eastern Mediterranean basin. For a century, from 1891 to 1990, temperature has declined by 1°C over Scandinavia while further away, over Central Europe on the path of MPHs, it has increased by about 2°C over the Ukraine and the Southern Russia, i.e. on the way of cyclonic southerly air streams (Schönwiese and Rapp, 1997). For the period 1961–1990, Litynski (2000) has confirmed a cooling of about 0.4°C over Scandinavia, the Northern Russia and Balkans, while a warming of '0.35°C on average' characterizes Ukraine and the Southern Russia.

Over the Mediterranean basin, temperature "*shows a pronounced diminution*" (Maheras, 1989), the mean fall being of the order of 1°C during 30 years over Central and Eastern Mediterranean (Kutiél and Paz, 2000). At Jerusalem the winter temperatures have recorded in 1992–1993 their lowest values along the period 1865–1993 (–3.5°C with regard to the 1961–1990 Normal), Israel having experienced in 1994 the worst winter in over 100 years (WMO, 1995). At present a "drought" situation prevails over the Mediterranean, especially over Spain (Gil Olcina and Morales Gil, 2001), Italy (Conte and Palmieri, 1990), over Algeria (Djellouli and Daget, 1993), and Greece where the rainfall deficit has become worrisome (Nalbantis et al., 1993; Nastos, 1993). The rise of pressure is strong, constant and general, over the Western and Central Europe (cf. fig. 4; Aubert, 2001) and over the whole Mediterranean basin (Makrogiannis et al., 1990; Conte and Palmieri, 1990; Leroux, 1996; Maheras et al., 2000; Kutiél and Paz, 2000). The upward pressure trend spreads further southwards over Northern Africa (Leroux, 1996; Nouaceur, 1999), while temperatures have simultaneously and remarkably declined in the Nile Valley, from 1.1°C at Alexandria and at Aswan (Litynski, 2000), and further South over Sudan (Omar Haroun, 1997). The pressure evolution at Constantza (fig. 4) compared with this one of the Arctic and Eastern Canada (fig. 1) is particularly telling. The pressure has fallen up to the *climate optimum*, then risen rapidly in connection with the Arctic cooling since the 1970s, exceeding 4 hPa, a value that is considerable at this average scale.

Another circulation unit is missing further East. To obtain a complete statement of the Northern Hemisphere, northern Asia must be included. This unit is supplied with MPHs following a Siberian path, which mainly follows to the east of the Urals, crossing Asia with great difficulties because of the relief and reaching the Pacific Ocean through China (Leroux, 1996). But information here is fragmentary. Litynski (2000) underlines the strong cooling (–0.70°C) over Siberia, with the record cold over Siberia and Mongolia during recent winters still in memory. Instead, warming was typical over the eastern coastal regions, which are within the trajectory of the southerly air stream. Such a deficiency in the documentation slightly reduces the firmness of the conclusions covering the whole Northern Hemisphere, but it does not modify its general signification.

In summary – and to stress again – recent climate changes are not those predicted by the IPCC models. Some regions are cooling, others are warming, precipitation is increasing or falling, pressure is rising or lowering, and everywhere the weather has

become more severe, more irregular, and more violent since the 1970s when the true climatic switch of the last century took place. These differences in the behaviour of weather may appear as uncoordinated, and even due to chance. But these co-variations, as briefly presented above for the North Atlantic area, are perfectly organized in a well-defined system of general circulation by the dynamics of MPHs, and obey the same initial reasoning. For 30 years the associated cooling of the Western Arctic has given increased strength to boreal MPHs and as a result produced an intensification of the meridional exchanges, that is a rapid mode of circulation. Such a weather evolution in the Northern Hemisphere represents an additional categorical denial of a “global warming” scenario.

CONCLUSIONS

Pollution is a serious and worrying problem, needing attention. But this matter does not need climate change as alibi, and makes, moreover, a very bad ‘scarecrow’. Because, a warming climate – if it were to really occur – might also bring many advantages (such as a higher comfort of living in the regions presently too cold; a diminution of heating budgets; milder weather; the spreading of suitable cultivation lands, both in the cold areas through the lengthening of the vegetative cycle, diminution of surface and ground frost, etc.; and in arid lands improvement of the tropical marginal rains, particularly the Sub-Saharan region). To present an hypothetical GW as a “catastrophe” is but a whimpering exercise in which the media excel. While such alarmism can indeed help to disseminate the anti-pollution message, that message is strictly scientifically speaking, falsified – and even wrong. A quick comparison may be made with the conditions prevailing during the Holocene Climatic Optimum (HCO, between 8,000 and 5,000 BP), when global temperature was 2°C higher than today. It is by no means certain that the result would be disastrous, but it is by no means certain that conditions would be comparable in all respects. This idea should not be stressed because such a warming scenario has not yet been demonstrated.

Nothing allows us to assert that GW had already begun, and by no means can one detect a “*perceptible influence of man*”. The denials are numerous and flagrant. In particular, the so-called ‘irrefutable’ proof, i.e. the standard-curve of the global temperature change, is also an illusion. Figure 6, for which the NAO index is to be considered as evidence of the intensity of meridional exchanges in the Northern Hemisphere, shows three distinct periods:

- In the beginning of the century, the gradual decreasing of NAO index (corresponding to the Arctic temperature increase) induces an attenuation of the differences between the opposite sides of each circulation unit. As a result an upward trend characterizes the mean temperature North of the latitude 30°N, which after a cold period approaches normal.
- During the middle of the century, the NAO index was moderate, the thermal contrasts are weaker in each circulation unit, between sides and between air masses, and the mean temperature is consequently near to the normal (cf. fig. 3-1).
- Since the end of the 1970s, the NAO index has shown a strong upward trend and

the increase of the mean temperature curve (modelled on the NAO’s) is directly connected with the intensified advection of warm air, on fronts of strengthened MPHs.

The supposed increase of temperature imputed to the greenhouse effect is thus only an artefact, induced by the acceleration of meridional exchanges and by a more intense supply of atmospheric and oceanic subtropical or tropical heat to the middle and high latitudes of the Northern Hemisphere. The effect of pressure rises should not be forgotten. The ‘reconstituted’ thermal curve is therefore, counter to the claims by IPCC, increasingly less climatologically significant in proportion to its rise. The key of its representativeness lies in the percentage of stations located in the cooling regions, or in the warming regions (or in the respective extension of the concerned areas), but any average between these two behaviours is artificial. Not a single serious conclusion about the actual significance of these curves can avoid such a conclusion. Applied over-precision does not fix the problem, simply because of the frequency of urbanized stations that dominate these records. It is necessary to highlight that GW-driven arithmetic or accountancy cannot be right if there is a mean “warming” north of the latitude 30°N (cf. WMO, 2001), and that it is this curve which determines the evolution of the so-called “global” curve (fig. 6). The dissimilarity between the relevant thermal curves shows that the Southern Hemisphere and the 0°–30°N latitudes play only a limited role in the “global” evolution, which is finally traced back to the relatively densely inhabited 30°–90°N latitudes. These curves again confirm the

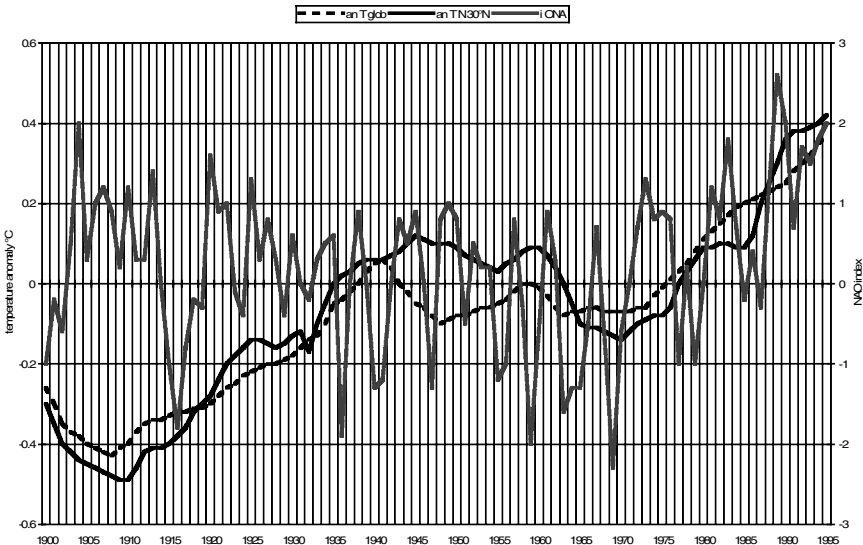


Figure 6. Evolution of the NAO index (i NAO = i ONA), from 1900 to 1995 (after Wanner, 1999), and of the “reconstituted” mean annual temperature, global (an T glob), and North of the latitude 30°N (an TN 30°N), after WMO (2001), from 1900 to 1995

importance of the Arctic cooling and its consequences for the meridional exchanges. This regional cooling is responsible in turn for the strong heating, which is thus the greater fact of the climate change since the 1970s.

The presumed warming – regional and limited – attributed to the greenhouse effect is dependent, in reality and fundamentally, on the dynamic factor. For the same reason, for example, the rise of meteorological hazards, the Great Sahelian Drought, the ENSO events, or the increasing number of tropical cyclones in the Southern Pacific (Leroux, 1996), are nothing else than a regional consequence of a change in the general circulation mode. The key climatological question today is to understand what exactly happened in the 1970s, and why? What provoked this climatic switch in the northern hemisphere. This change, let us emphasize, is ignored by climate change models and IPCC experts. It is most important indeed to monitor the present trend related to the cooling of the Western Arctic to see if it will continue with the same intensity, or whether it will diminish, or even reverse. To prophesy unverifiable facts to the 2100 horizon is useless and extremely expensive. When one dares to claim to predict the climate of 2100, one must understand, at the very least, the climate change of the last century and be able to explain why dramatic events such as extreme rainfall, tornadoes, gales and storms have occurred more often during recent decades. It is also necessary to explain, for example, why rainfall was so high over Brittany and over the Somme basin during the winter and autumn 2000 – 2001. It is not possible to be satisfied with such a recent announcement that:

“nothing authorizes us to say that the floods... are related to greenhouse effect... one can say that these abundant rains are exactly the type of events which the models will be more frequent during this present century” (that is absolutely wrong, models are unable to predict it!)... *“but, take care, it does not signify that floods will occur every year. No, we shall also know dry years”!* (M. Petit, “expert” of the French delegation to IPCC, President of the Société Météorologique de France, in “Le Monde”, 19 April 2001).

The emptiness of such a talk obviously reflects a too common psittacism (i.e. parrot fashion repetition) and does not belong in “climatology”. The task of climatology is to study whether the actual trends are towards either increased rainmaking or drought producing conditions, and of the circumstances that are favourable to gales or storms. It can only contribute usefully in this way to decision-making about concrete and immediate preventive measures that might be adopted, specifically in Mediterranean areas where floods are particularly dramatic. The time and the funds needlessly spent to maintain the fiction of GW, could then be used judiciously. That is, in the vast field of applied climatology where it is uniquely sensible to apply the precautionary principle.

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