



The building committee meets. The conservator starts by specifying the environment, relying on the wisdom of the standard committee.

7.3 Recommended storage temperatures and relative humidity

7.3.1 *Storage temperature for frequently-handled material*

The temperature for the storage of frequently-handled paper and parchment should be as constant as possible. In order to avoid the need for acclimatization (see 7.3.4) when documents move from storage to reading room and back, the temperature should be at a fixed point between 16 °C and 19 °C with a tolerance of 1 °C on either side, but ranging neither below the minimum nor above the maximum. Documents in transit should be protected against the effects of any unsuitable environment between the repository and the reading room, and the distance between the two should be minimized

7.3.2 *Storage temperature for infrequently-handled material*

Little-used material will benefit from being stored at cooler, constant temperatures. The temperature should be at a fixed point within the range of 13 °C to 16 °C with a tolerance of 1 °C on either side. The material should be allowed to acclimatize before use in a transitional environment such as that recommended in 7.3.1.

How wise is the standard?

Extract from BS5454:2000

Interpretation by the National Preservation Office:

between 16°C and 18°C, or between 17°C and 19°C

No evidence given for the need for constancy to ± 1 degree, nor for the lower limit

7.3.3 Relative humidity

Relative humidity should be at a fixed point between 45 % and 60 % with a tolerance of 5 % on either side, but ranging neither below the minimum nor above the maximum. Rapid changes should be avoided. Little-used paper not in bound volumes may be stored at a relative humidity of 40 %, but should then be acclimatized before use (see 7.3.4)

...

7.4 Ventilation

NOTE See also 5.2.2 for reducing air infiltration.

7.4.1 General

The air within the repository should not be stagnant. There should be sufficient air movement to avoid pockets of stagnant air.

NOTE Air movement removes off-gassing of organic materials and prevents a build-up of pockets of high relative humidity.

If a mechanical ventilation system is provided, it should be designed to reduce pollutant concentration by introducing a proportion of fresh air (see 7.5.3) and by providing air distribution that will avoid areas of stagnation. Care should be taken over the location of air diffusers since loaded shelves create barriers to air circulation.

Extract from
BS5454:2000

Confused explanation
for ventilation
requirement: mixing up
a specification of what
climate to attain with a
naive view of how to
achieve it.



Enforcement of the British Archive Standard demands supplementary non-standard instrumentation.

The standard states that it is advisory, but in practice it has metamorphosed into a specification:

"It was considered paramount that environmental conditions conformed to British Standard 5454: 2000. In essence, environmental conditions needed to be stable and within the parameters stated for temperature and relative humidity (RH), 13–16°C and 45–60% RH for infrequently handled material....

The air ventilation system of the mine draws in fresh air through one of the shafts at a rate of 135 m³/s. ... Air movement within the individual storage areas ... is considered sufficient to avoid stagnant air pockets."

from:

An alternative for the long-term storage of archival records – a salt mine in Cheshire

Anna E. Bülow, Head of Preservation, The National Archives

Tom Gregan, Head of Archive Production Services, The National Archives

WHERE SHALL WE PUT IT? SPOTLIGHT ON COLLECTION STORAGE ISSUES

Papers given at the National Preservation Office Conference held 4 October 2004

at the British Library

The unconsidered consensus, enshrined in standards:

Constant temperature

Constant relative humidity

Air movement

Are these assertions justifiable?

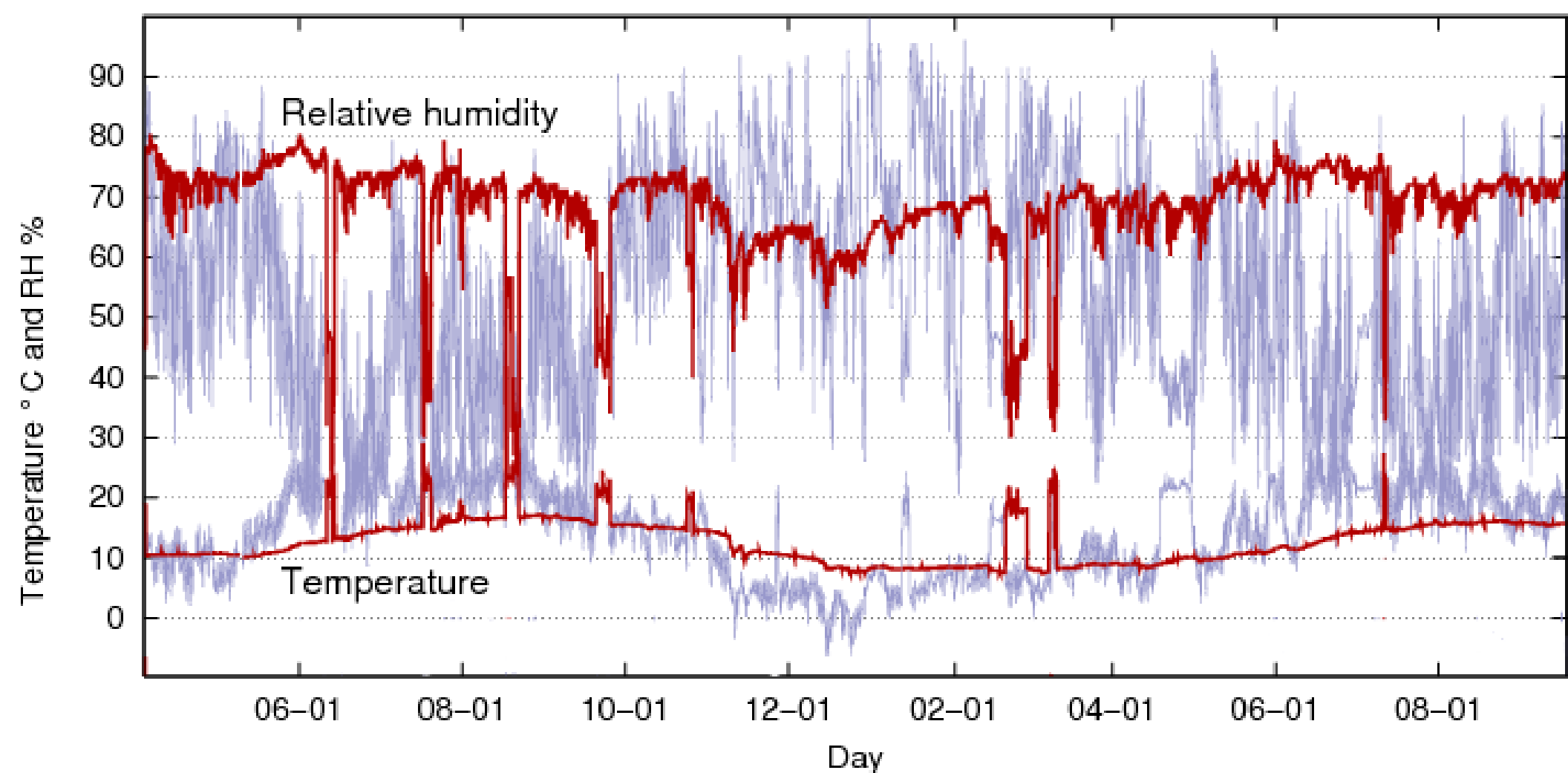
They seem to be based on what is achievable rather than what is necessary, and uncertain concepts such as ventilation rate are veiled in vague expressions.

Standards should be based on scientifically verified findings on the effect of the environment on materials and structures.

However, science still cannot measure very slow deterioration, so let's start by looking at historical evidence



The Alcazar of Segovia, Spain. The military archive is behind the lowest range of small windows.

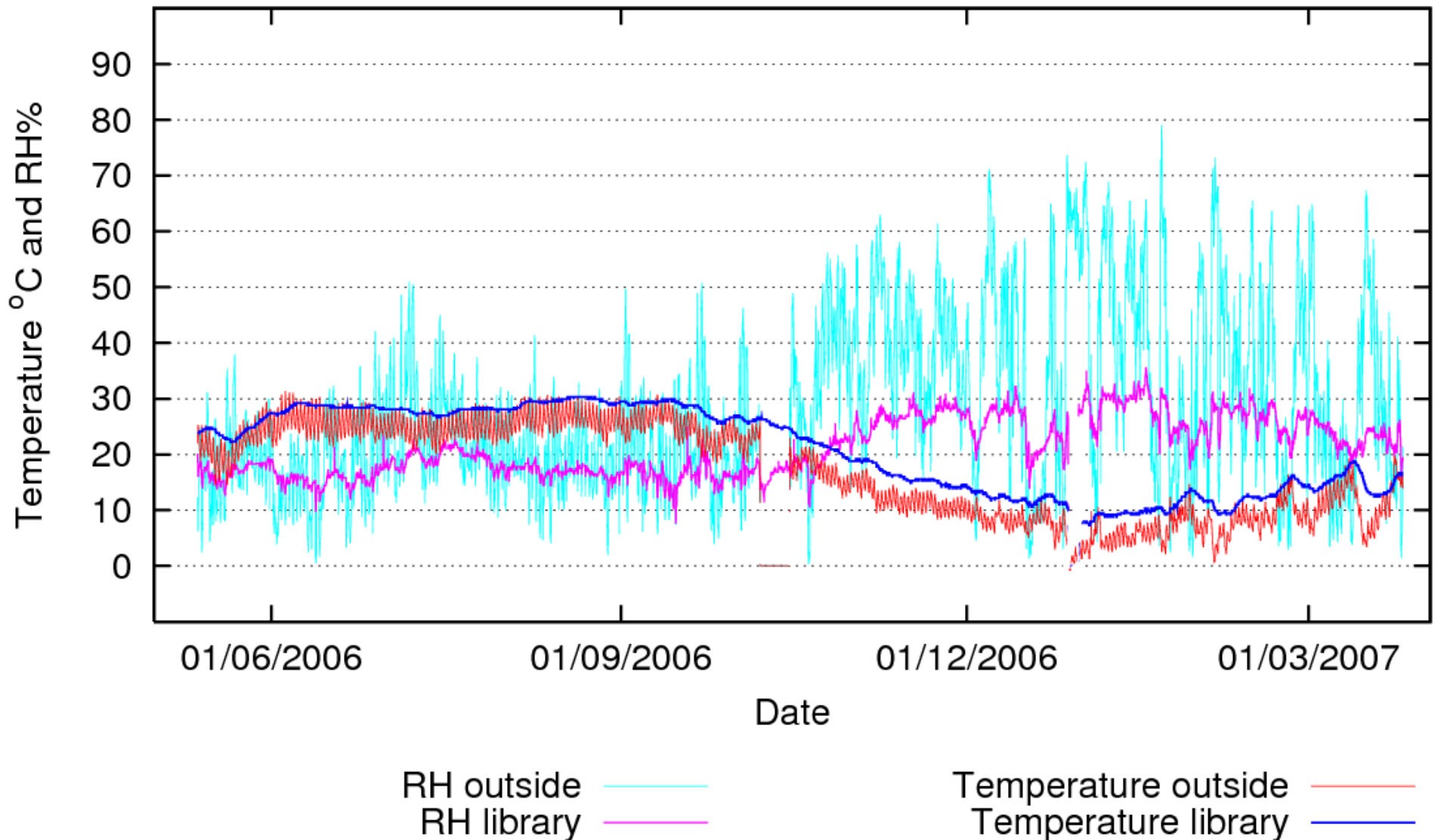


Alcazar archive climate over a year and a half.

Naturally buffered, no heating – RH perilously high but no visible biological growth.



St. Catherine's Monastery, Sinai, Egypt

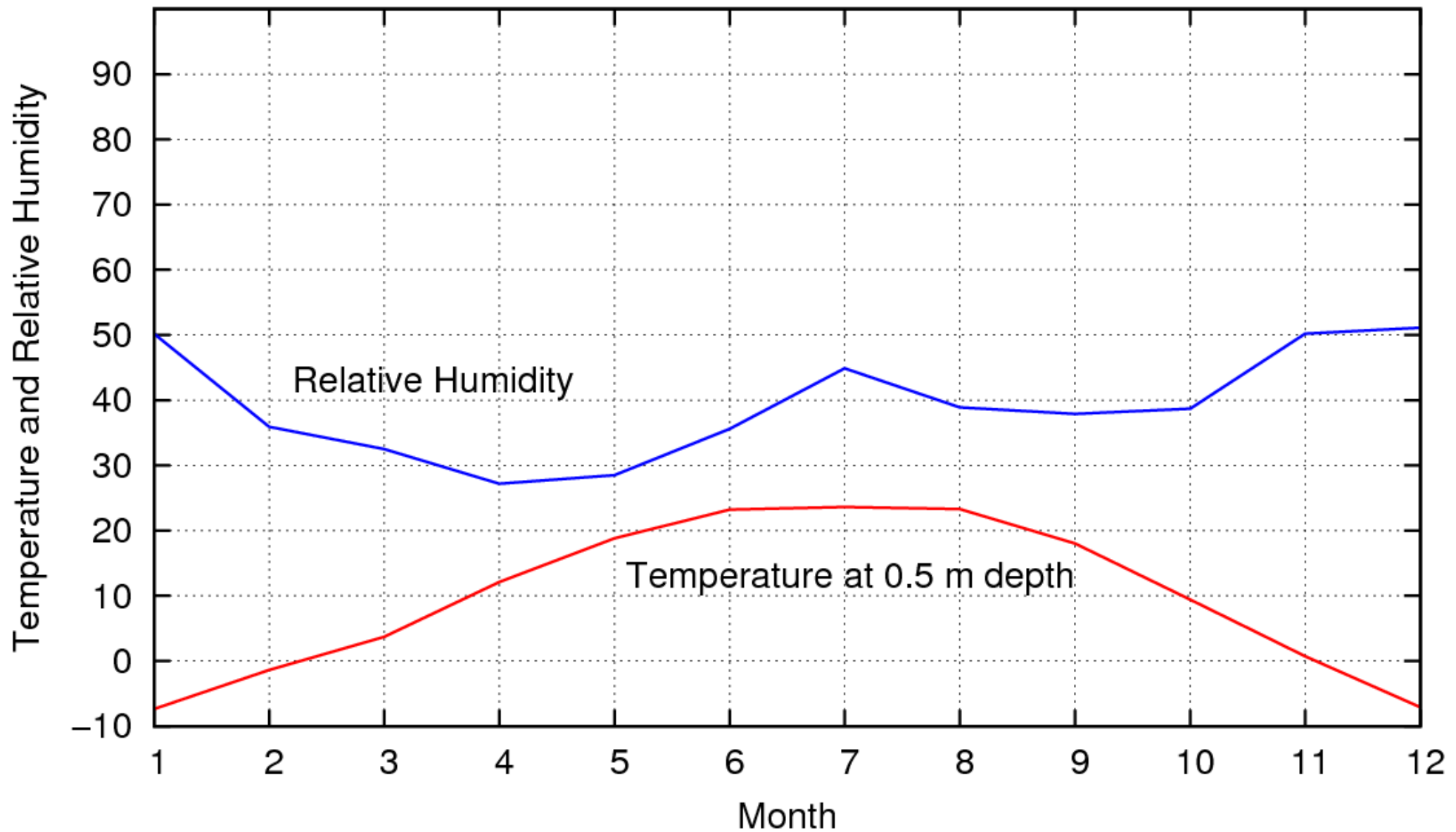


Climate in the library of St. Catherine's Monastery, Sinai, Egypt

Some natural buffering, no heating, low RH,
 Damage through high summer temperature is compensated
 by low RH



Archive without a roof: In 1901, Swedish explorer Sven Hedin discovered paper from the third century, perfectly preserved under half a metre of blown sand in a ruined building near Lop Nur in the Taklimakan desert of Eastern Turkestan

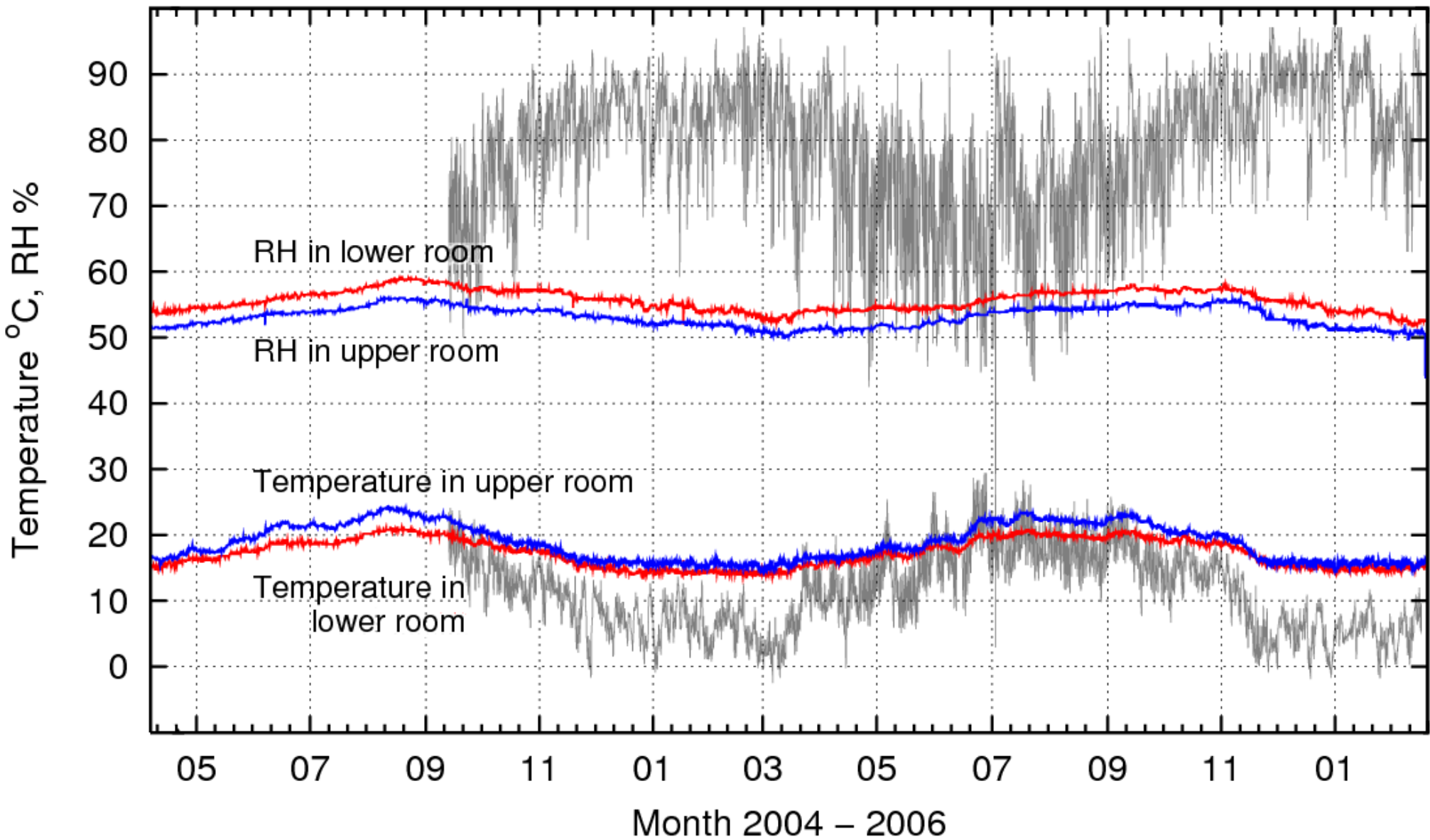


There are no climate data in the expedition records. Here is the climate predicted at 0.5 m depth from Dunhuang, China, in the same desert environment.



The Suffolk Record Office, Ipswich, UK
Architect Henk Pieksma, built 1990

Designed to be heated in winter, with inertial humidity control



Climate in the Suffolk Record Office

The temperature variation was judged to be in conflict with BS5454:2000, so air conditioning has now been installed



Section through the wall of the Suffolk Record Office



The Royal Library, Copenhagen. 1999. Architects Schmidt, Hammer and Lassen. An outward tilted wall cannot safely have high thermal capacity.



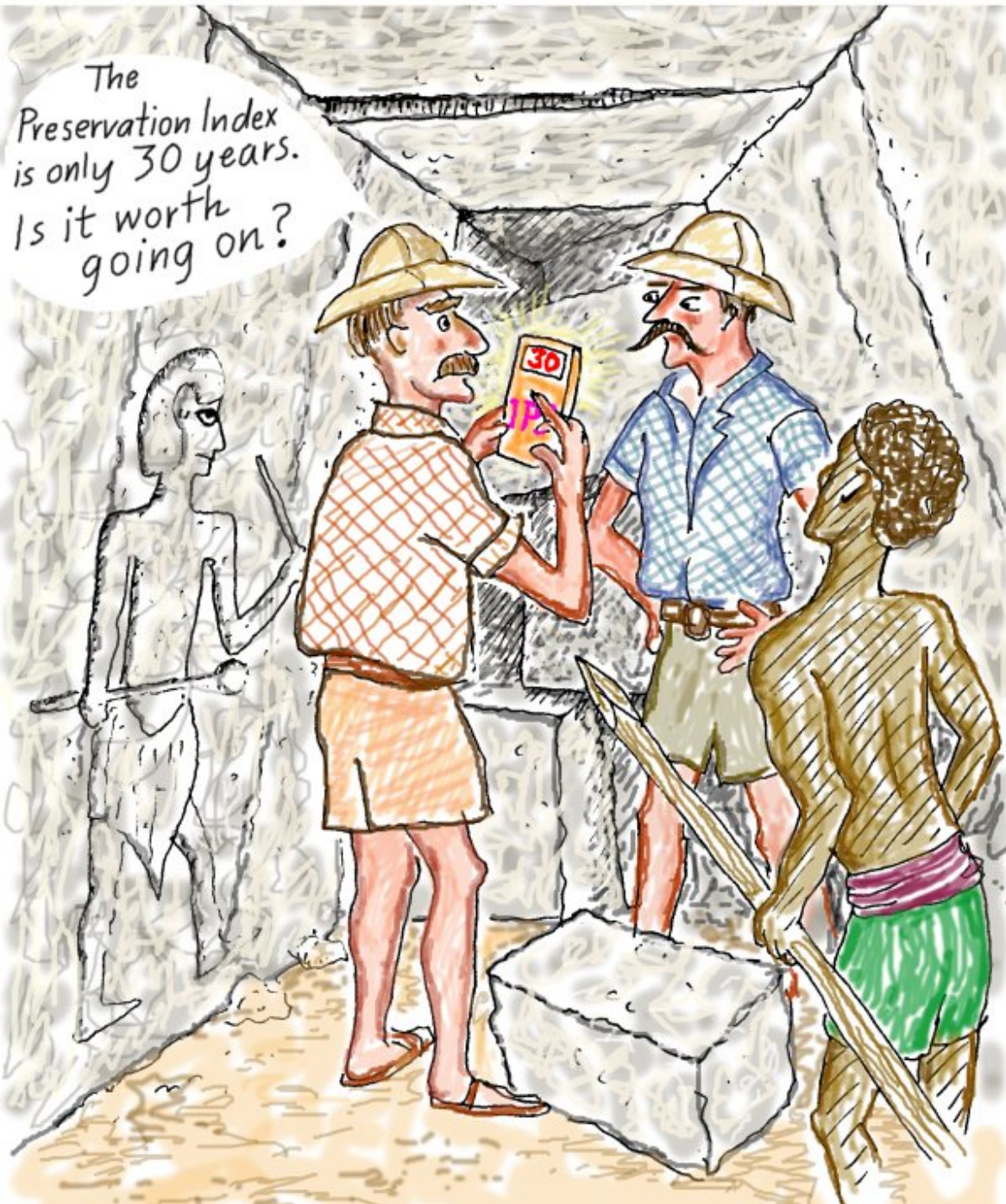
The Royal Ontario Museum, extension by Daniel Libeskind, 2007. Air conditioning of spaces was abandoned in favour of air conditioning of each showcase.



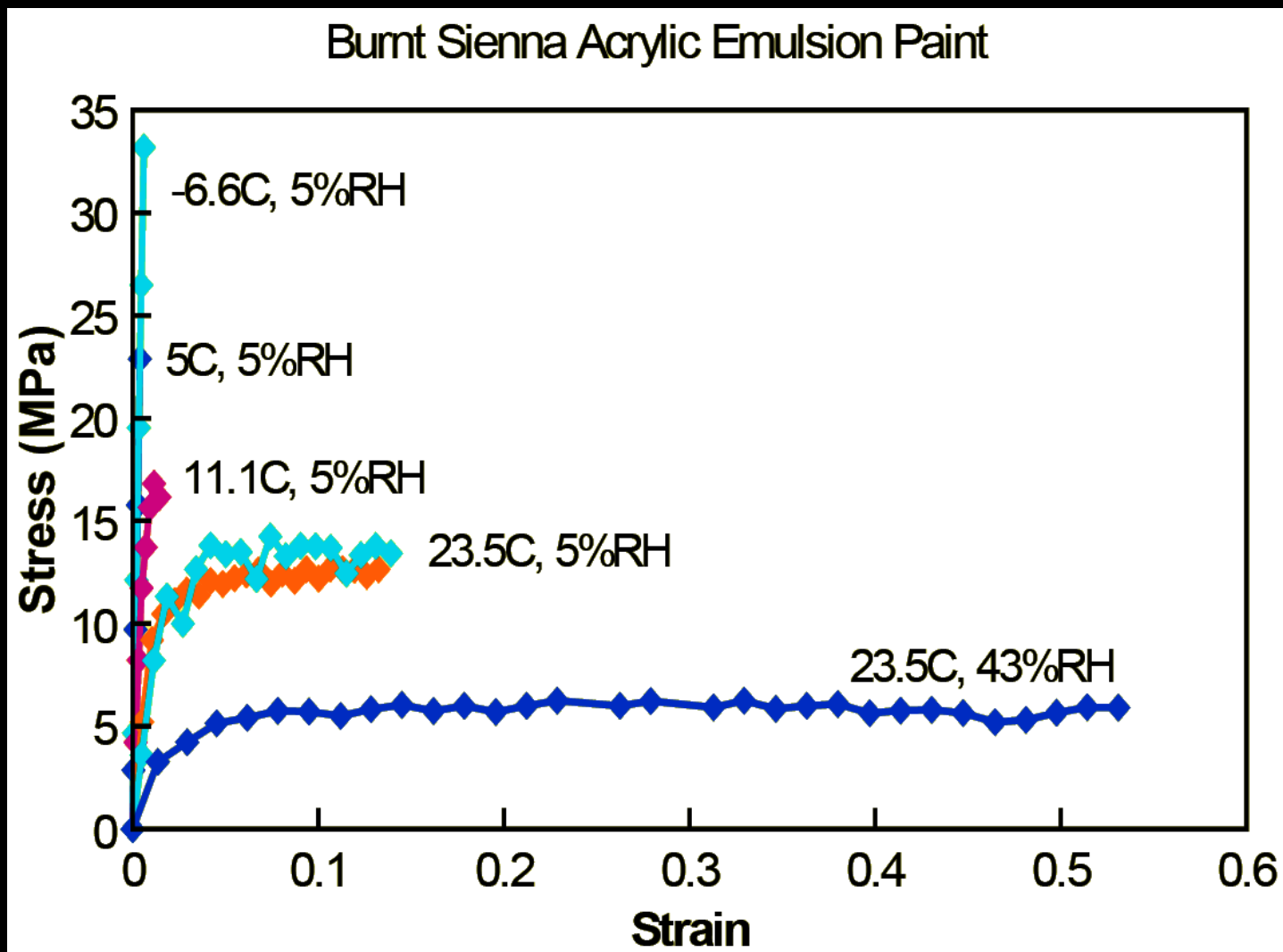
The influential standards in conservation have been developed by individuals or institutions, without peer review

The most used specification for the museum environment comes from Garry Thomson's book:
The Museum Environment

Momentous decisions in archaeology: Tutankhamun



Another influential environmental standard is derived backwards, from measurement of the actual environment to show the supposed quality of that environment.



[Marion Mecklenburg]

The basis for all environmental standards must be a scientific evaluation of the causes of damage, based on peer reviewed original research.



[Storm P]

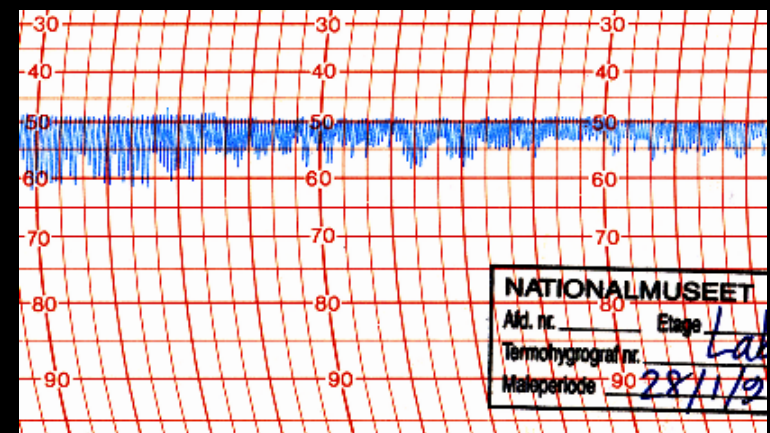
The internet provides the opportunity for collaboration which will allow the development of rational standards unencumbered by subservience to institutional prestige.

The essential pre-requisites for museum environmental standards:

Scientific evidence for environmental effects on artifacts, leading to a rational ideal climate and safe limits to its variation.

Requirements for a building structure that naturally provides a good climate; particularly heat capacity, moisture buffer capacity and air change requirements.

Requirement for obtaining and storing environmental measurements for quality control of the actual climate.



There is more about museum standards at:

<http://www.padfield.org/tim/wiki/index.php/Cfys/Standards>

This is an advertisement:

Course in the design of museum and archive storage,
Copenhagen, School of Conservation

26 – 30 October 2009.

Info:

www.padfield.org/tim/wiki/index.php/Storage/Announcement

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