第85窟的保存

Preserving Cave 85

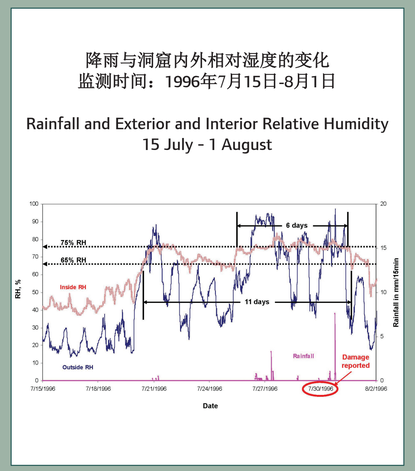
由于无法完全消除一些引起病害的因素，因此对壁画进行加固时，还必须采取其他的措施减缓病害的发生。如果不采取这些措施，保护处理最终将会失效，壁画也将继续劣化。

在第85窟，病害的主要因素是可溶盐。它仍然存在于壁画中，而控制窟内的湿度就可以减缓盐害对壁画的影响。

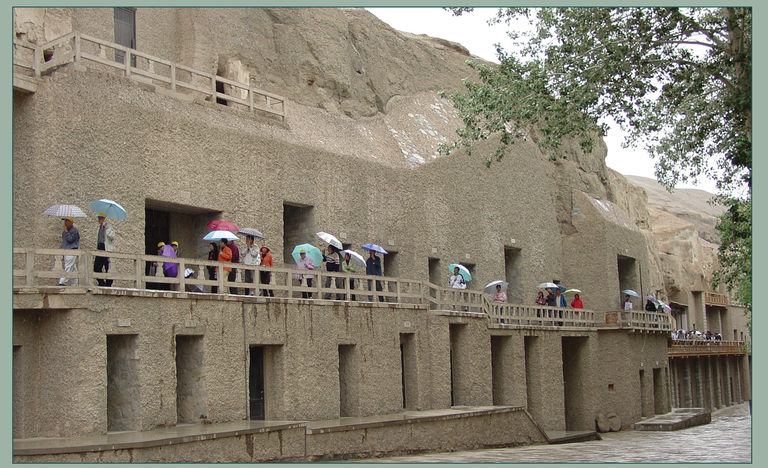
As it is not possible to eliminate some causes of deterioration, efforts to slow decay are needed in addition to stabilization treatments. Without such measures treatments will eventually fail and the paintings will continue to deteriorate.

In the case of Cave 85, the principal cause of deterioration—soluble salts—is still present and mitigation of their effects is based on control of humidity in the cave.

莫高窟崖顶设置有全自动气象站可监测降雨强度与雨量、空气温度、相对湿度、风速和风向等气象因子。
A weather station at the top of the cliff measures rainfall intensity and amount, air temperature, relative humidity, and wind speed and direction.



1996年在一段时期的降雨后，第85窟窟顶壁画脱落（图上底部的粉红色线条显示了降雨强度）。降雨对相对湿度的影响很大。比较一段时期的降雨前后相对湿度的变化。
Collapse of painted plaster from the ceiling in 1996 followed a period of rainfall (pink lines at base of graph indicate rainfall intensity). The effect of rain on the relative humidity (RH) is dramatic. Compare the RH before and after the major period of rain.



尽管莫高窟处于沙漠的环境中，当地还是会降雨。降雨虽然罕见，还是会使窟内相对湿度升高至危险的阶段。相对湿度的突然升高会激活盐分，引发壁画病害。
Despite the desert setting it does rain at the site. These rain events, though rare, can cause the relative humidity to rise to dangerous levels inside the caves. The rise in relative humidity can activate salts leading to deterioration of the wall paintings.

预防措施
Preventive Measures

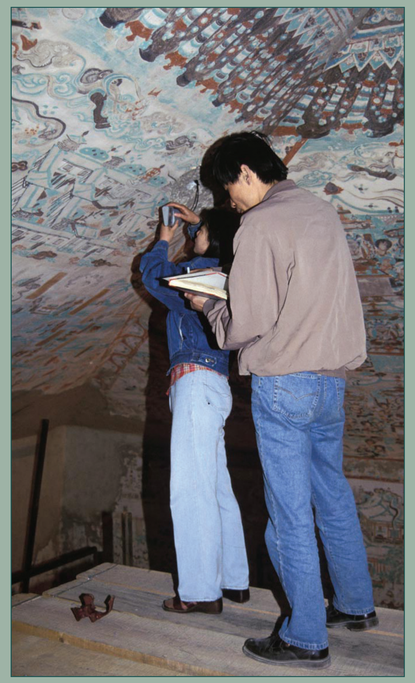
环境控制措施可以有效地减缓与盐分有关的病害发生。特别是在降雨期间，关闭洞窟的门可以减低窟内外空气的交换率，从而保持窟内湿度的稳定。

Environmental control measures are effective in slowing salt-related deterioration. Keeping the door to the cave closed reduces air exchange between the interior and the outside climate, thus maintaining stable humidity conditions in the cave, particularly during periods of rain.

第85 窟入口。
The entrance door to Cave 85.

鉴于泥质地仗的脆弱状况和壁画对水的高度敏感，降低可溶盐只能限于局部选定的区域。使用超声波加湿器配合吸水棉纸可以用来吸收表面及表面下的盐分。
Reduction of soluble salts was limited to select areas given the fragile condition of the earthen plaster and the water sensitive painting. An ultrasonic humidifier was used with absorbent tissue to absorb surface and subsurface salts.

在第85窟内部也监测温度和相对湿度。相对湿度高于67%时，壁画中的盐分就会从空气中吸收水分，因此将窟内相对湿度保持在该数值以下是保存洞窟的关键。
Monitoring of temperature and relative humidity was also undertaken inside the cave. Above 67% relative humidity salts absorb moisture from the air. Keeping the humidity below this value is key to preserving the cave.



定期下载洞窟内不同位置监测探头所收集的数据。
Data was regularly downloaded from monitoring probes at various locations throughout the cave.

现状监测
Condition Monitoring

在完成第85窟的保护工作之后，进行定期监测壁画状况。因为引起病害的因素不能完全消除，现状监测就显得非常重要。

Following completion of conservation treatments in the cave, the condition of the wall painting is regularly inspected. Condition monitoring is important because the causes of deterioration cannot be completely eliminated.

选择壁画区域进行定期现状监测。
Areas of the wall painting were selected for regular monitoring of condition.

在监测期间对监测区域进行肉眼检查和拍照。
Areas are checked and photographed during these periods of monitoring.