**Maya Water Problems**

**玛雅的水源问题**

To understand the ancient Mayan people who lived in the area that is today southern Mexico and Central America and the ecological difficulties they faced, one must first consider their environment, which we think of as “jungle" or 'tropical rainforest." This view is inaccurate, and the reason proves to be important. Properly speaking, tropical rainforests grow in high-rainfall equatorial areas that remain wet or humid all year round. But the Maya homeland lies more than sixteen hundred kilometers from the equator, at latitudes 17 to 22 degrees north, in a habitat termed a “seasonal tropical forest." That is, while there does tend to be a rainy season from May to October, there is also a dry season from January through April. If one focuses on the wet months, one calls the Maya homeland a "seasonal tropical forest"; if one focuses on the dry months, one could instead describe it as a "seasonal desert.”

为了了解生活在今天南墨西哥和中美中地区的古玛雅人种以及他们所面对的生态困境，那么我们必须先研究他们的环境，也就是今天我们所谓的“丛林”或者“热带雨林”。这种观点虽然不是很准确，但是环境因素的意义还是很重要的。严格

意义上讲，热带雨林生长在赤道附近常年保持潮湿的多雨地区。但是玛雅的故地

是在离赤道六百多公里的北纬 17-22 度之间，也就是通常所说的“季节性热带雨

林”里。也就是说，这个地区在五月到十月是雨季，而在一月到 4 月又是旱季。

如果是关注湿季的话，可以说玛雅的故地是一个“季节性丛林”，如果关注旱季的

话，那玛雅的故地就可以替换并解释为“季节性沙漠”了。

From north to south in the Yucatan Peninsula, where the Maya lived, rainfall ranges from 18 to 100 inches (457 to 2,540 millimeters) per year, and the soils become thicker, so that the southern peninsula was agriculturally more productive and supported denser populations. But rainfall in the Maya homeland is unpredictably variable between years; some recent years have had three or four times more rain than other years. As a result, modern farmers attempting to grow corn in the ancient Maya homelands have faced frequent crop failures, especially in the north. The ancient Maya were presumably more experienced and did better, but nevertheless they too must have faced risks of crop failures from droughts and hurricanes.

玛雅人所居住的尤卡坦半岛从南向北的年降水量是从 18 英寸到 100 英寸（457

到 2540 毫米）逐级递增的，而且土地也是逐级加厚，所以半岛南部的农业生产

力相对较高，相伴随的也就能养活更多的人。不过玛雅故地的跨年降雨量的变化

程度是不可预测的。一些年份的降雨次数要比其他年份的多三到四次。正因如此，

当现代的弄明打算在古玛雅人的故地种植棉花的时候就经常会面临种植的失败，

尤其是在半岛的北部。古玛雅人也许更有经验也做得更好，但是不管怎么说他们

都必须面对旱灾和飓风而导致的颗粒无收的风险。

Although southem Maya areas received more rainfall than northern areas, problems of water were paradoxically more severe in the wet south. While that made things hard for ancient Maya living in the south, it has also made things hard for modem archaeologists who have difficulty understanding why ancient droughts caused bigger problems in the wet south than in the dry north. The likely explanation is that an area of underground freshwater underlies the Yucatan Peninsula, but surface elevation increases from north to south, so that as one moves south the land surface lies increasingly higher above the water table. In the northern peninsula the elevation is sufficiently low that the ancient Maya were able to reach the water table at deep sinkholes called cenotes, or at deep caves. In low-elevation north coastal areas without sinkholes, the Maya would have been able to get down to the water table by digging wells up to 75 feet (22 meters) deep. But much of the south lies too high above the water table for cenotes or wells to reach down to it. Making matters worse, most of the Yucatan Peninsula consists of karst, a porous sponge-like limestone terrain where rain runs straight into the ground and where little or no surface water remains available.

尽管玛雅故地的南部比之北部有更多的降雨，但是在潮湿的南方，水资源问题的

矛盾性要更加尖锐。古代南部生活的玛雅人所面临的麻烦，在今天也困扰着现代

考古学家，他们想不通为什么古代的旱灾的影响在湿润的南方要比干旱的北方大。

一种可能季节是尤卡坦半岛的地下水资源的区域是倾斜的，但是地表的上升幅度

要低于古玛雅人能挖到的含水层的深层排水口，叫做“cenote”,或者叫深层含水层。较低高度的北方沿海地区没有白税控，玛雅人应该可以借助凿井到达 75 英尺（22米）深的地下水含水层。但是南方想要通过排水口或是凿井来到大含水层的话，深度就要深得多。更要命的是，尤卡坦半岛是由水浊石灰岩构成的，一种多孔海绵型就石灰岩地域，当雨水来临时水会笔直的流入地底并不在地表留下任何水分。

How did those dense southern Maya populations deal with the resulting water problem? It initially surprises us that many of their cities were not built next to the rivers but instead on high terrain in rolling uplands. The explanation is that the Maya excavated depressions, or modified natural depressions, and then plugged up leaks in the karst by plastering the bottoms of the depressions in order to create reservoirs, which collected rain from large plastered catchment basins and stored it for use in the dry season.For example, reservoirs at the Maya city of Tikal held enough water to meet the drinking water needs of about 10,000 people for a period of 18 months. At the city of Coba the Maya built dikes around a lake in order to raise its level and make their water supply more reliable. But the inhabitants of Tikal and other cities dependent on reservoirs for drinking water would still have been in deep trouble if 18 months passed without rain in a prolonged drought. A shorter drought in which they exhausted their stored food supplies might already have gotten them in deep trouble, because growing crops required rain rather than reservoirs.

那么南部如此密集的玛雅人是如何应对水资源问题的呢？起初最令我们惊讶的

是玛雅的一些城市并不是建在河边的而是建在旋转与会的高地上的。之所以这么做是因为玛雅人开凿或者改造自然的低地，与此同时通过粉刷低地的地步来堵住水蚀石灰岩的的裂口，再用它来做成水库收集雨水以备旱季之用。比如说，位于玛雅太卡城的水库的出水量可以供 10000 人在超长无雨的旱季喝上 18 个月。即使是较短的旱季他们耗费掉所储存的食物供应或许已经成为更深层次的问题，因为作物的生长需要雨水要远比水库的多。