

# MAYA COSMOLOGY

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## 1ST MODULE STUDY GUIDE

### HISTORICAL & ETHNOGRAPHICAL BACKGROUND



## Contents

GEOLOGY OF THE MAYA REGION .....	2
ECOSYSTEMS OF THE MAYA REGION .....	6
POLITICAL GEOGRAPHY OF THE MAYA REGION .....	9
HISTORICAL EVOLUTION OF THE MAYA .....	10
EVOLUTION OF MAYA LANGUAGES.....	11

## GEOLOGY OF THE MAYA REGION

### 1.1.1

From the book *Encyclopedia of the Ancient Maya*

"The ancient Maya occupied lowland and highland areas of what is today southern Mexico and northern Central America, Where they exploited terrains characterized by different rock types. Local geology shaped Maya culture because it: (1) provided construction material; (2) was the base rock for soil development; (3) gave rise to local water bodies; (4) led to cave formation; and (5) was the source of clay and stone used to make ceramics, tools, and art objects (see also Map 7), The Maya lowlands of the Yucatan Peninsula are characterized by fossil-rich sedimentary rock called limestone (calcium carbonate,  $\text{CaCO}_3$ ), which formed in ancient shallow seas. In some parts of the peninsula, there are local deposits of gypsum (calcium sulfate,  $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ ). The land surface in the lowland area now lies 0 to — 3111 masl. The age of exposed rock generally increases from north to south. Barrier islands on the north coast formed within the last 10,000 years, whereas surface rock in southern Petén, Guatemala dates to the time of the dinosaurs, more than 65 million years ago. The Maya Mountains of Belize are an exception on the low-lying, limestone-rich peninsula, in that they possess ancient granites that are more than 420 million years old and rise > 1,100 masl.

The northernmost part of the Yucatan Peninsula is flat, farther south; the processes of faulting and folding gave rise to hilly topography. The ancient Maya used limestone to build their great ceremonial centers and to carve ornate monuments with inscribed texts and illustrations called **stelae**. Crushed limestone was burned to create lime ( $\text{CaO}$ ), to which water was added to make construction mortar and stucco, Lime was also used to prepare corn tortillas, a staple of the Maya diet. Mineral soils derived from the limestone bedrock are nutrient-poor, and ash from slash-and-burn agriculture helped to fertilize soils with required plant nutrients (see also subsistence). Long-term dissolution of the limestone bedrock gave rise to karst terrain, characterized by pockmarked surface rock, sinkholes, caves, and underground conduits that carry groundwater. Rivers and streams are features of the Southern Lowlands, but the Northern Lowlands are devoid of flowing surface Waters. Numerous caves, such as Calcehtok and Loltun, were perceived as portals to the underworld (Xibalba). A ring of sinkholes (cenotes) in the northwest Yucatan Peninsula surrounds the site where the Chicxulub meteorite crashed into the ocean 65 million years ago, ending the reign of dinosaurs. Clays in the limestone lowlands were used to make polychrome pottery vessels.

A hard, silica-rich rock called chert, of which flint is one type, formed as nodules within the limestone and was knapped to form tools, weapons, and works of art (see also Warfare, Warriors, and Weapons). The Maya highlands include parts of the state of Chiapas (Mexico) and much of southern Guatemala. The area is characterized by Steep volcanic terrain. Faulting and volcanism in the highland region are related to plate tectonics, including passage of the Cocos Plate beneath the Caribbean Plate, and eastward sliding of the Caribbean Plate relative to the North American Plate. Earthquakes and

landslides are common. The Maya highlands possess rocks of diverse ages, including Paleozoic metamorphic rocks, Paleozoic, Mesozoic and Quaternary sediments, and Tertiary and Quaternary volcanic rocks. There are 37 volcanoes in the Guatemala highlands, of which 4 remain active. Volcano Tajumulco, in southwest Guatemala, is the highest point in Central America (4,220 m asl). The highlands possess rich volcanic soils that were exploited for agriculture by the ancient Maya. The Maya also used volcanic ash to temper their pottery. Large caldera lakes such as Atitlán and Ayarza were formed by volcanic eruptions and collapse of magma chambers, ca. 84,000 and ca. 20,000 years ago, respectively (see also Map 7). Jade from the highlands was traded widely and utilized for carvings. Personal adornments and burial tribute (see also Portable Objects). Obsidian was also traded and knapped to make arrowheads, spear points, knife blades, and ceremonial objects.

The geology of the Maya region shaped the lifeways of the area's ancient occupants by providing construction material; generating agricultural soils; yielding clay and rock from, which ceramics, tools, and art objects were fashioned; and giving rise to the water bodies that were critical to human survival.

### 1.1.2

From: <https://theculturetrip.com/north-america/mexico/articles/this-is-how-mexicos-yucatan-peninsula-was-really-formed/>

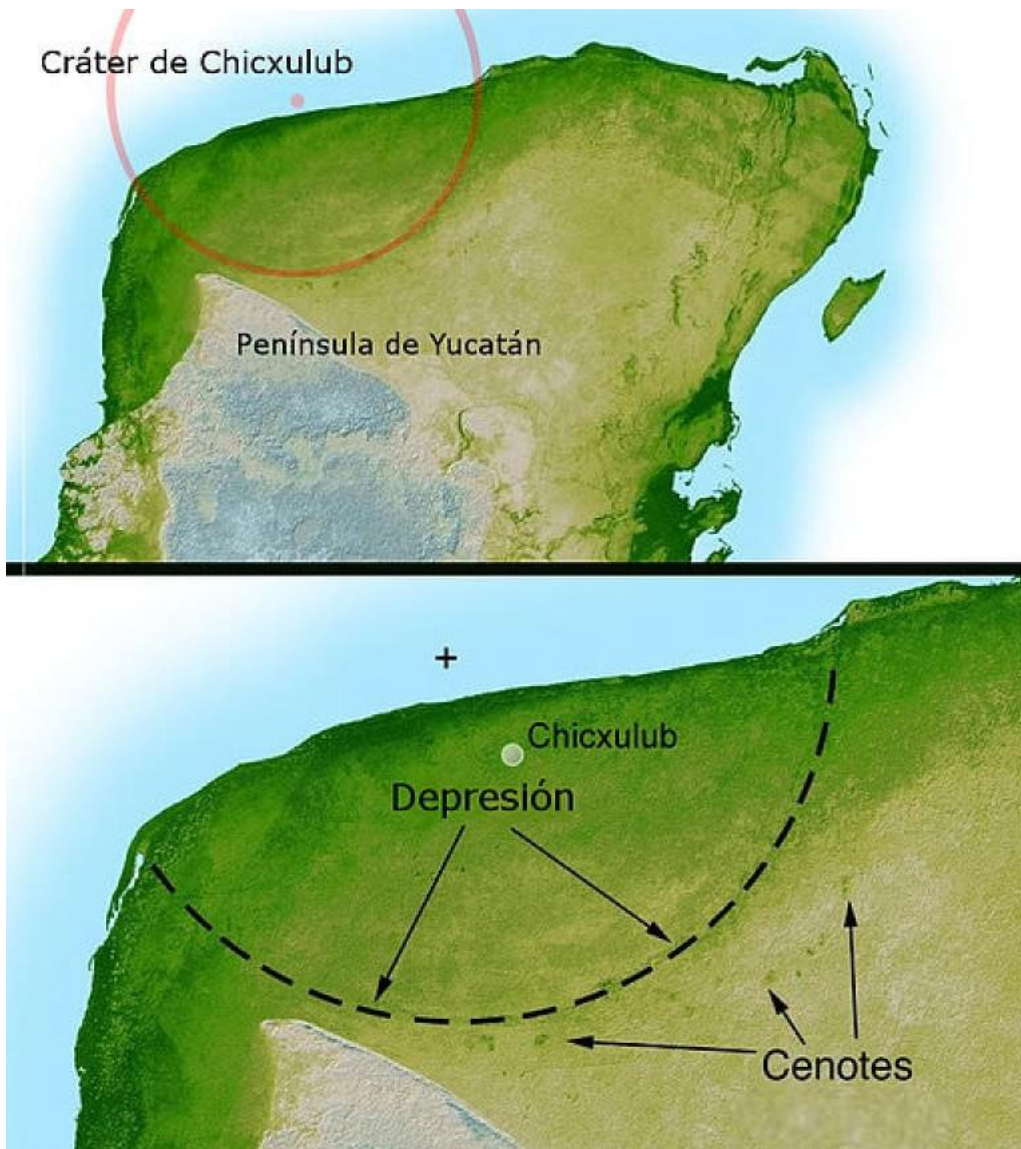
"The geology of the Maya region shaped the lifeways of the area's ancient occupants by providing construction material; generating agricultural soils; yielding clay and rock from, which The geology of the Maya region shaped the lifeways of the area's ancient occupants by providing construction material; generating agricultural soils; yielding clay and rock from, which With its stunning beaches and pristine lagoons, Mexico's Yucatán Peninsula is a place of extraordinary natural beauty. Formed on a massive limestone platform and boasting hundreds of cenotes (underwater sinkholes), the peninsula is defined by some unique geological characteristics. The story behind this unusual territory dates back to a massive asteroid impact, an event that many scientists believe triggered the extinction of the dinosaurs.

### The Chicxulub Crater

An aerial view of the [Yucatán](#) shows some striking features. Firstly, there are no surface rivers or streams in sight. Secondly, the entire region is dotted with cenotes, which vary dramatically in size and shape.

A circular ring of cenotes surrounds Yucatán's state capital of [Mérida](#), and inside that ring there are very few of them. This unusual geological feature provides important evidence for one of the major events in the history of the planet. Around 65 million years ago, a giant comet struck the northern Yucatán. Analysts believe it measured about six to nine miles (10 to 15 kilometers) in diameter. The impact created a huge crater, which is today known as the Chicxulub Crater, because it struck near the town of Chicxulub. Chicxulub crater impact map.

© NASA/JPL-Caltech / WikiCommons



### The effects of the impact

Many scientists believe the comet caused worldwide climate turmoil, including shockwaves that provoked global earthquakes and volcanic eruptions. One well-established theory holds that the asteroid also triggered a global rise in temperature that wiped out the dinosaurs. This mass extinction created an evolutionary space for the development of mammals from smaller creatures such as echidnas, into larger, more sophisticated mammals, such as human beings.

### The cenotes of the Yucatán

When the comet struck, the region now known as the Yucatán Peninsula was entirely covered by ocean, which is why you see no evidence of a crater inside the impact zone.

Most of the huge limestone platform we now know as the Yucatán Peninsula began to slowly rise from the ocean around 24 to 33 million years ago. It appears that some sections of the northern Yucatán were formed as early as 1.8 million years ago. Because of its geological history, the peninsula is very flat and tilts towards the sea. It also contains the world's highest concentration of cenotes. Because there were no rivers in the region, the ancient Mayans used to draw their water from cenotes. Because they sustained life in the region, the Mayan revered these cenotes as sacred sites. Religious offerings, including human skeletons, have been discovered in many cenotes in the area."

### 1.2.3

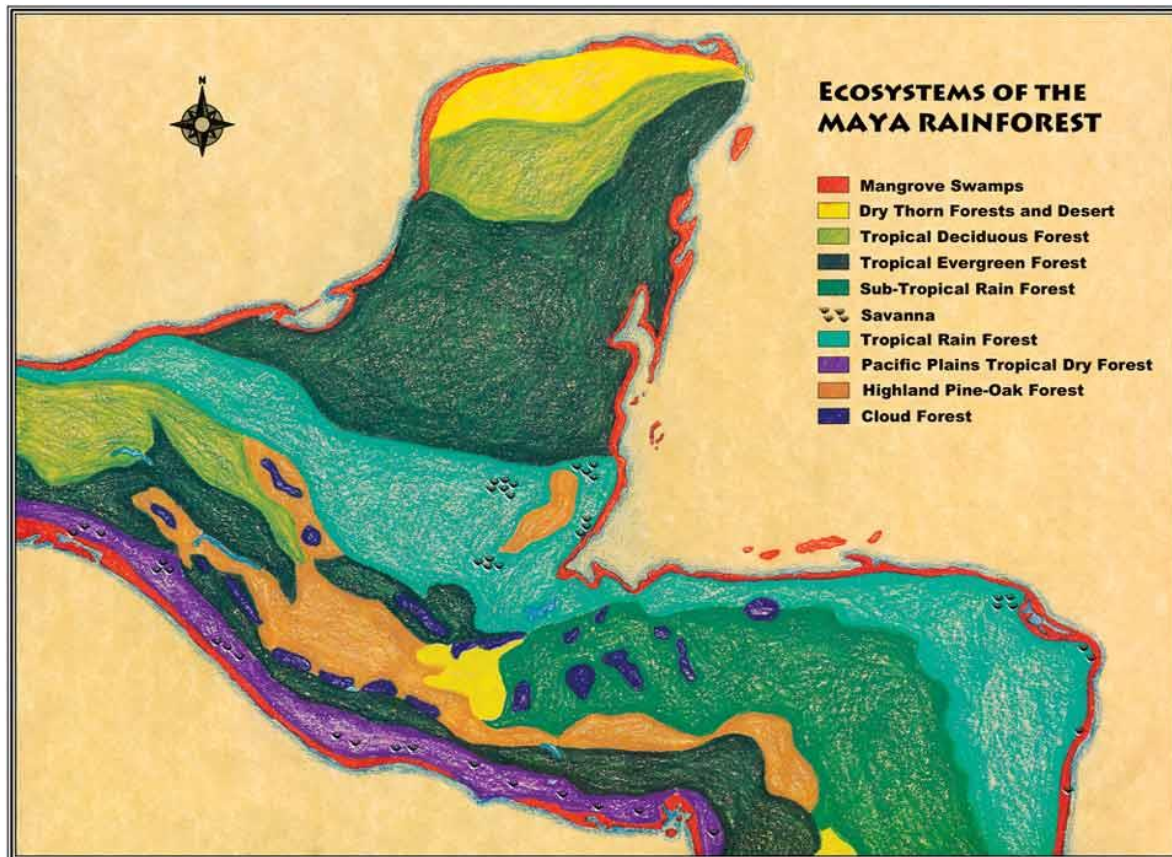
Recommended further reading about northern Yucatan's geology:

<https://www.backyardnature.net/yucatan/geology~.htm>



## ECOSYSTEMS OF THE MAYA REGION

### 1.2.1 Map of the Ecosystems in the Maya Region.



From the book *In the Land of Green Lightning* by Thor Janson

### 1.2.2 Article on Ecosystems of the Maya Region.

From: <http://www.revuemag.com/2013/06/ecosystems-of-the-mayan-rain-forest/>

## An incredible diversity of life exists in the Mayan Rain Forest, the biological crossroads of the Americas

For centuries the land of the Mayan rain forest has been of particular interest to biologists because of its unique location. It is at the crossroads of two of Earth's major life zones: the Nearctic Realm (North America) and the Neotropical Realm (South America). It is here in the bio-geographical heart of the continent where many neotropical plants and animal species reach their northern limits of distribution, while large numbers of Nearctic genera and species reach their

southern range of dispersal. Maples and oaks grow alongside mahoganies and zapotes; coyotes and mountain lions share the forest with olingos, howler monkeys and jaguars.

Over vast periods of time, including at least four ice ages, major migrations of both plants and animals occurred across the narrow isthmus. As glacial ice melted, the oceans rose, inundating much of Central America.

Many species became isolated on mountaintops that had become islands. Today the ancient tropical highland forests are home to large numbers of unique species and have the highest rate of endemism.

The exceedingly varied types of soil and topography, ranging from the ancient Cuchumatanes Mountains to relatively youthful volcanic areas, combined with marked altitudinal and climatic variations, from hot deserts to cold alpine regions, have given Guatemala the richest flora in all of Central America with an estimated 8,000 species of vascular plants. Of this number many are unique species confined to particular canyons and volcanos. Tropical rain forests are located in a belt around the planet between the Tropic of Cancer and the Tropic of Capricorn, the main limiting factor being temperature. Rain forests cannot exist where average temperature falls below 20 degrees centigrade (68°F). This temperature boundary is related to both latitude and altitude. Ecological zones occur because as altitude increases, temperature decreases, resulting in climatic conditions favoring different plant communities. The rain forest boundary is reached at about 3,000 feet above sea level. At this elevation, there is a gradual transition into montane broad-leaf forest and, higher up, mixed pine-oak forest. Along windswept mountain ridges the nearly permanent cold fog favors a ghostly pygmy forest where the trees are small and scraggly, covered with a profusion of orchids, bromeliads and other epiphytes.

At the crossroads of two of Earth's major life zones, maples and oaks grow alongside mahoganies and zapotes; coyotes and mountain lions share the forest with olingos, howler monkeys and jaguars.

If we made an expedition from Guatemala's Sipacate beach and followed a straight line northeast up to the Río Lagartos Special Biosphere Reserve on the north coast of the Yucatán Peninsula, we would pass through some 20 distinct life zones.

Let's begin our journey on the wickedly hot black sands of the Pacific shore with a profusion of sea birds and the nesting ground for endangered sea turtles. From the coast we would go through the mangrove swamps. These dense, bug-infested forests provide nesting grounds for many bird species, nurseries for fish and shelter for a wide variety of animals. Around every bend we feel the presence of the master of the ambush. Crouching hidden in the tall grass, cruising undetected just beneath the grey gossamer hull of my kayak, the gaping maw of the giant leviathan *Crocodylus acutus* (American crocodile).

Next we cross a wide belt of high coastal forest, where huge trees reach up toward the sun, trunks whitened with lichens and covered with vines, making them very difficult to identify. Within the forest large "islands" or savannas, typified by coarse



sandy soil, support a variety of grasses, bushy plants and small stands of slash pine. From here we ascend up through a transitional zone called “bocacosta,” featuring ferns, palms and large trees covered with vines.

Up we go into the mountains, scaling the 13,000-foot peak of Tajumulco volcano, the highest point in Central America. Here mist-enshrouded cloud forests and pine forests predominate.

Now on through the central Highlands and a series of inland plateaus and valleys, where pronounced wet and dry seasons and moderate temperatures favor forests of pine, juniper and cypress and a profusion of flowering herbaceous plants.

The alpine habitats of the Cuchumatanes is where we encounter cold pine forests and enchanting meadows of tussock grass, succulents and giant agaves. From here we begin a gradual descent into the vast lowland forests of the Yucatán. Our route takes us throughout three biosphere reserves: Montes Azules, Mayan and Calakmul.

As we move northward, rainfall diminishes and forests become dryer and less exuberant.

Approaching the end of our expedition, we pass through wide belts of deciduous and dry thorn forests which are desert-like, hot and arid.

From here to the northern coast, once again we find ourselves in hot mangrove swamps, the foraging ground for thousands of pink flamingos.

Finally, we reach the sand dunes and the blue waters of the Caribbean Sea. We are ready to take a dip in the ocean and paddle out to the coral reef. The reef itself is the result of tiny animals related to jellyfish building little shelters of calcium carbonate, one on top of another. After millions of years, these structures have become what is today a magnificent reef. The reef ecosystem is in many ways the marine equivalent to the rain forest; both are considered the Earth’s most productive life systems. The reef teems with its seemingly endless array of tiny, brightly hued tropical fish, squadrons of fierce-looking barracuda, meandering parrot fish and groupers, hair-raising hammerhead sharks and an occasional gentle manatee.

We end our journey standing on the sands of the Yucatán, gazing out at the ocean, the red sun looking as though it is melting into a molten sea of gold.

## POLITICAL GEOGRAPHY OF THE MAYA REGION

### 1.2.2 Map of current political divisions of the Maya Region.



## HISTORICAL EVOLUTION OF THE MAYA

### 1.3. Mesoamerica

The Maya People were part of a greater cultural and geographical area called Mesoamerica. To fully understand their evolution through time, it is important to understand the whole evolution of Mesoamerica.

Some of the significant cultural traits defining the Mesoamerican cultural tradition are:

- **sedentism** based on **maize agriculture**
- the construction of **stepped pyramids**
- the use of two different **calendars** (a 260-day ritual calendar and a 365-day calendar based on the **solar year**)
- **vigesimal** (base 20) number system
- the use of locally developed **pictographic** and **hieroglyphic** (logo-syllabic) **writing systems**
- the use of **rubber** and the practice of the **Mesoamerican ballgame**
- the use of **bark paper** and **agave** for ritual purposes and as a medium for writing and the latter also for cooking and clothing
- the practice of various forms of ritualistic **sacrifice**, including **Human sacrifice**
- a **religious complex** based on a combination of **shamanism** and natural deities, and a shared system of symbols
- a **linguistic area** defined by a **number of grammatical traits** that have spread through the area by diffusion<sup>[9]</sup>

For a good understanding of this region and its historical evolution we recommend the reading of the following article: <https://en.wikipedia.org/wiki/Mesoamerica>

## EVOLUTION OF MAYA LANGUAGES

### 1.4 Chart of Mayan Languages of today, the branches they come from and their evolution through time.

