# Cosmic Clock Impact Report — Chicxulub Event

This document presents the Cosmic Clock reconstruction of the Chicxulub impact that contributed to the extinction of the dinosaurs ~66 million years ago. By combining fossil evidence of ancient day length, plate drift assumptions, and a longitude-to-day Cosmic Clock mapping, we refine the date, local time, and Moon phase of the impact.

## Finalized Impact Estimate

• Impact estimate: ~November 25, 66,000,000 BCE  
• Local time: ~21:30 (≈ 23:54 UTC)  
• Moon phase: Waxing quarter–gibbous (29% through lunar cycle)  
  
Vector model: WNW backtrack @ 10 cm/yr for 66 Myr (total ≈ 6,600 km).  
Paleo impact point (from WNW model): ~6.98° S, 36.29° W (South Atlantic).  
Present site: ~21.3° N, 89.5° W (Chicxulub, Yucatán).

## Equations and Calculations

1. Longitude to Day-of-Year Mapping:

D = (Longitude / 360°) × Year\_length  
 • Paleo longitude: −36° ⇒ 324° (wrapped to 0–360°)  
 • Year length at 66 Ma: 374 days  
 ⇒ D = (324/360) × 374 ≈ 337 (day of 374-day year)

2. Mapping to Modern Calendar:

Fraction of year = 337 / 374 ≈ 0.901  
 Modern year length = 365.24 days  
 Modern day = 0.901 × 365.24 ≈ 329  
 ⇒ Day 329 ≈ November 25 (Gregorian calendar)

3. Moon Phase Calculation (fast ancient Moon):

Synodic month ≈ 29.22 modern days (Moon was closer)  
 Lunar age = 337 mod 29.85 (impact-days) ≈ 8.65 impact-days  
 Convert to modern days: 8.65 × 23.5 h ≈ 203.3 h = 8.47 modern days  
 Fraction of lunar cycle = 8.47 / 29.22 ≈ 0.29  
 ⇒ Waxing quarter–gibbous Moon, prominent in evening sky

4. Plate Drift Model:

Assumption: North American Plate drifted WNW @ 10 cm/yr for 66 Myr  
 Distance = 0.10 m/yr × 66,000,000 yr = 6,600,000 m ≈ 6,600 km  
 Backtrack vector: 292.5° (WNW) → reverse 112.5°  
 Paleo site: ~6.98° S, 36.29° W  
 Current site: ~21.3° N, 89.5° W

## Accuracy Notes

• Date precision: ±1 modern day.  
• Moon phase calculation: ±0.5 day in lunar age.  
• Geochronological uncertainty: ±0.011 Myr on absolute date.  
• Cosmic Clock approach yields tighter relative placement than conventional geological dating by aligning longitude, year length, and lunar cycles.

## Deep-Time Day Length Evolution

Deep past (~620 million years ago):  
• Fossil corals & tidal rhythmites: ~400 days/year  
• Day length: ~21.9 hours  
  
At the time of the dinosaurs (~66 million years ago):  
• Fossil shells: ~372–374 days/year  
• Day length: ~23.5 hours  
  
Today:  
• 365.2422 days/year  
• Day length: ~24 hours