Figure 86. Outline of geomorphic history of Chaco Canyon. Time scale at left is logarithmic.

1. **year 1975**
   - Sept. 9, channel sands swept out of channel, deposited on banks, channel base exposed and scoured; chute cutoff erosion continues; undercut arroyo walls collapse into channel
   - channel sand partly eroded by April
   - Chaco Arroyo flows intermittently for week in early Spring

   - Chaco Arroyo flows twice
   - Arroyo flows, channel built up further during heavy rains, transparency of arroyo photographically enhanced
   - Arroyo flows, wet Spring, Arroyo flows several times, channel built up during Spring
   - Arroyo flows; Black and White aerial photographs

3. **summar precipitation shows two-year oscillation; frost free season declines by thirty days**
   - U.S. Geological Survey aerial photographs
   - 1963添注 notes an inner channel and banks
   - 1961 Leopold maps inner channel and banks
   - 1956 Dry year, 85.1 mm precipitation
   - Mathews photographs inner banks
   - 1951 dry year, 85.1 mm precipitation

4. **1925**
   - Holzinger, Peppers photography, geology by Dodge

5. **500 years**
   - 1877-1890 Arroyo fills to within 1.5 m of top and recuts
   - 1877 Jackson describes Chaco Canyon, maps arroyo 4.9 m deep, 12-18 m wide
   - 1849 Simpson visits Chaco Canyon, names pueblo
   - 1840 moist conditions, modern Chaco Arroyo initiated
   - American Independence declared
   - Archaeological dates
   - Chaco tree-rings present in Chaco Canyon
   - 1680 Pueblo revolt against Spanish
   - 1630 Navajos have obtained livestock, sheep
   - small arroyo cut-and-fills in this period
   - 1540 Coronado visits New Mexico
   - 1492 Columbus
   - Navajo enter area

6. **1000 years ago**
   - Late Pueblo III archaeological dates
   - Early Pueblo III last tree ring date on occupation
   - Early Pueblo II arroyo cut-and-fill
   - Pueblo I Chaco tree-rings early Bonito channels
   - Basketmaker pithouses built on floor of canyon
   - arroyo cut-and-fill, undated
   - arroyo cut-and-fill
   - Hall's oldest C14 date, 5.5 m depth in colluvial sediments
   - arroyo cut-and-fill only top 1.5 m exposed
   - 7 m below present surface
   - End of Pueblo IV
   - Initial cutting of Chaco Canyon begun, at least two gently rolling geomorphic surfaces with 1 m of calcite developed

**Archaeological Background**
- beginning of "Viscous" glacieral stadials. If discharge increased during this time, Chaco River may have eroded to bedrock floor of the canyon, and alluviated the canyon floor in late Pliocene
- several red soils form on sandy colluvium and windblown deposits
- gravel deposits in gravel quarry may have formed at this time of high discharge. Chaco River on bedrock part of this time canyon fills during eric interglacial
- slope and cemented gravel benches below first Cliff House cliff
- cemented talus, soils and arroyo-lik deposits formed under semiarid conditions
- cemented gravel on bench above first Cliff House cliff
- cemented sand dome above junction of Escalada Wash
- loose gravel on mesa margin

**Pliocene**
- 10,000,000 years
- BEGINNING OF PLEISTOCENE

**10,000,000 years**

**1,000,000 years**

**100,000 years**

**Here and There**

**10,000 years**