Scientific Event:
The Earth's Cloud Cover Becomes Less Dense

Time Frame: ~4.3 billion years ago

The scientific descriptions on these pages are derived from AI investigations using ChatGPT and Gemini 3 asking for the history of . The AI output has been revised appropriately for improved accuracy, ease of comprehension, and relevance to this study of Genesis 1.

Background: The Origin of *Clouds* on the Earth

From the time the Earth began to form about 4.54 billion years ago until roughly 4.3 billion years ago, the planet's atmosphere and cloud conditions changed significantly. Around 4.5 billion years ago, the impact with a Mars-sized body often called Theia produced a global or near-global magma ocean. As the molten Earth began to cool after the impact, a new atmosphere formed from volcanic activity that was dominated by water vapor, carbon dioxide, and nitrogen with atmospheric pressures with tens to hundreds of times modern sea-level pressure levels. As Earth continued to cool between about 4.45 and 4.40 billion years ago, this thick steam atmosphere created an extreme greenhouse effect that slowed the planet's cooling. The atmosphere likely contained early clouds that both reflected incoming sunlight and trapped outgoing infrared radiation. The surface of the Earth during this time would have been almost completely hidden beneath an opaque sky, with little to no direct sunlight reaching the ground. By roughly 4.40 to 4.30 billion years ago, Earth's surface temperature dropped below the critical point of water, allowing water vapor to begin condensing more efficiently. Earth's skies would not have resembled modern conditions. Cloud cover was still thick and persistent, the young Sun was fainter than it is today, and frequent impacts likely injected dust and aerosols into the atmosphere. The planet was probably still shrouded in haze much of the time. Geological evidence supports the idea that oceans and rainfall had begun by this point, even while Earth remained a geologically violent and opaque world.

- **Time Frame:** 4.54 to 4.3 billion years ago
- **Evidence:** Zircons in Australia show interaction with water by ~4.4 Ga, geochemical models.

Development of Increased Transparency of the Cloud Cover

Between approximately **4.3 and 3.9 billion years ago**, Earth's atmosphere underwent a profound transformation, shifting from a hot, opaque, impact-dominated envelope to a more stable, ocean-coupled system that allowed more sunlight to reach the surface. This transition was gradual, uneven, and strongly controlled by planetary cooling, volatile cycling, and declining external energy inputs.

1. **Thick, vertically extensive steam clouds**
    a. **Time Frame:** ~4.3 to 4.1 billion years ago
    b. Little direct solar radiation reaches the surface
    c. **Evidence:** Radiative – convective climate models, comparative planetology with Venus and Mars
2. **High altitude, multilayer clouds**
    a. **Time Frame:** ~4.1 to 4.0 billion years ago
    b. Patchy transparency
    c. **Evidence:** Radiative – convective climate models, comparative planetology with Venus and Mars
3. **Persistent but broken cloud cover**
    a. **Time Frame:** ~4.0 to 3.9 billion years ago
    b. Clouds resemble thick marine stratocumulus
    c. **Evidence:** Radiative – convective climate models, comparative planetology with Venus and Mars

Description in Genesis 1 of This Event

And God said, "Let there be light," and there was light. God saw that the light was good, and he separated the light from the darkness. God called the light "day," and the darkness he called "night." And there was evening, and there was morning—the first day.

Genesis 1:3-5 (NIV)

Passages left highlighted are those most relevant to the scientific event of interest

The approach that this supplement pack takes in making associations between Genesis 1 events and scientific events is to use the earliest scientific event that makes sense according to the Hebrew words used in Genesis 1 (i.e., the use of good hermeneutics) while also considering where the event would likely be placed on a timelines that is consistent with the sequence of events described in Genesis 1.

Just as a reminder, we are taking the point of view for the Genesis 1 narrative as the Spirit of God hovering over the surface of the earth, as described in Genesis 1:2. So, this day 1 description of light appearing would be from the point of view of the surface of the earth. Given the likelihood of the Theia collision with the early earth as described above (or some similar event), it then would be consistent that from the perspective of the surface of the earth that after this collision had settled, then there would be much more light coming through the cloud cover over the earth. This would then be consistent with the appearance of light on the earth - "Let there be light".

It is also worthwhile to take note of the original Hebrew words for the appearance of light in Genesis 1:3. The English phrase of "Let there be", as in "Let there be light" is translated from the Hebrew word *yehi* which is a form of *hayah*. *Hayah* has a meaning of "To be, become, come to pass, exist, happen". This is different than the Hebrew words *bara* that is used for "creating" or *asa* which is used for "making" or *yasar* which is used for "forming". The Hebrew then is consistent and suggests that the light (in this case from the sun) has already been created. The light that has been there since the creation of the sun is now only becoming visible from the surface of the earth.