# TOEFL Listening Lesson 23

**Setting**: A Geology classroom. The professor leads a discussion about volcanic eruptions and their impact on global climate. Students occasionally contribute examples and questions. The professor speaks most of the time, guiding the conversation.

## Questions

**1. What major volcanic eruption led to the "Year Without a Summer"?**

A) Mount Pinatubo

B) Mount St. Helens

C) Mount Tambora

D) Krakatoa

**2. What gas released by volcanic eruptions is mainly responsible for causing global cooling?**

A) Carbon dioxide

B) Methane

C) Sulfur dioxide

D) Nitrogen

**3. What recent volcanic eruption helped scientists better understand how aerosols affect sunlight?**

A) Mount Tambora

B) Mount Vesuvius

C) Mount Etna
D) Mount Pinatubo

**4. Why does the professor mention the idea of geoengineering in the discussion?**
A) To explain how humans could intentionally cool the planet using volcanic gases
B) To describe the dangers of volcanic eruptions
C) To argue that volcanic eruptions permanently cool the Earth
D) To suggest that volcanic eruptions produce more carbon dioxide than human activity

**5. Why does the professor emphasize that not all volcanic eruptions impact the global climate?**
A) To show that only eruptions near the equator matter
B) To explain that only large, sulfur-rich eruptions reaching the stratosphere cause noticeable cooling
C) To argue that volcanic eruptions usually warm the atmosphere
D) To highlight that effusive eruptions are more powerful than explosive ones

## Script

**Professor:**
Good morning, everyone. Today we're going to discuss how volcanic eruptions can influence the global climate. Now, who can start us off? Can anyone think of a major volcanic eruption that had a significant effect on global temperatures?

**Male Student:**
Mount Tambora?

**Professor:**
Exactly—Mount Tambora, which erupted in 1815 in Indonesia. That eruption was so powerful it led to what we call the "Year Without a Summer" in 1816. Crops failed across Europe and North America because temperatures dropped significantly. This gives us an early historical example of the climate-changing power of volcanoes.
Now, why do eruptions like Tambora's have such a big impact on the atmosphere?

**Female Student:**
Because they release ash?

**Professor:**
Good guess, but more importantly, they release huge quantities of sulfur dioxide into the atmosphere. That gas combines with water vapor to form tiny particles called aerosols, which reflect sunlight away from the Earth. This reflection leads to cooling.
Interestingly, it's not just any eruption that affects the climate. The

eruption must be powerful enough to inject material into the stratosphere—above the weather systems—where it can linger for months or even years. Smaller eruptions don't have the same impact.

**Male Student:**
Wasn't there a recent eruption that affected climate, like Mount Pinatubo?

**Professor:**
Yes, excellent example. Mount Pinatubo in the Philippines erupted in 1991. It caused global temperatures to drop by about half a degree Celsius for roughly two years. Satellite data collected at the time gave us an unprecedented look at how aerosols spread around the globe. Pinatubo taught scientists a lot about how aerosols interact with sunlight. The cooling effect was noticeable, but it was temporary. Over time, the particles settled out of the atmosphere, and the temperatures rebounded.

**Female Student:**
So could a big eruption counteract global warming?

**Professor:**
That's a fascinating question, and actually, some scientists have proposed geoengineering strategies that mimic volcanic eruptions—deliberately injecting aerosols into the stratosphere to cool the planet. But there are serious concerns about side effects, like altering rainfall patterns or damaging the ozone layer. It's not a perfect or risk-free solution.
Remember, volcanic cooling tends to be short-lived—typically a few

years at most. Plus, the social and agricultural disruptions caused by sudden cooling can be catastrophic.

**Male Student:**
Are there other factors besides aerosols that matter?

**Professor:**
Yes. Volcanic eruptions can also emit carbon dioxide, a greenhouse gas, but even large eruptions usually release far less $CO_2$ than human activities do. So, their cooling effect from aerosols generally outweighs any warming effect from volcanic $CO_2$.
It's also important to consider that not all eruptions are explosive enough to reach the stratosphere. Effusive eruptions, like those in Hawaii, release lava flows but don't have much atmospheric impact.

**Female Student:**
So the size and type of eruption matter?

**Professor:**
Exactly. Volcanic eruptions must be highly explosive and rich in sulfur dioxide to significantly affect climate. Size, eruption column height, and sulfur content are key factors.
Alright, for next class, I'd like you to read the case studies on Krakatoa and El Chichón and think about how those eruptions compare to the examples we discussed today.

Answers

1. What major volcanic eruption led to the "Year Without a Summer"?
Correct Answer: C) Mount Tambora

2. What gas released by volcanic eruptions is mainly responsible for causing global cooling?
Correct Answer: C) Sulfur dioxide

3. What recent volcanic eruption helped scientists better understand how aerosols affect sunlight?
Correct Answer: D) Mount Pinatubo

4. Why does the professor mention the idea of geoengineering in the discussion?
Correct Answer: A) To explain how humans could intentionally cool the planet using volcanic gases

5. Why does the professor emphasize that not all volcanic eruptions impact the global climate?
Correct Answer: B) To explain that only large, sulfur-rich eruptions reaching the stratosphere cause noticeable cooling