WHAT: In this clip from 2001 presentation "Local, Regional, and Global Effects of Amazonian Deforestation," atmospheric scientist Dr. Roni Avissar explains that deforestation is leading to increased landscape heterogeneity (areas with patches, as opposed to uniform, land cover) in the Amazon. Along with the presence of water, heterogeneity can act as a triggering mechanism in the formation of thunderstorms. Storm formation is most likely to be triggered when the patches are around 70km, and human development in the Amazon tends to follow patterns of that size, spreading in patches that branch off 50 to 100 km from the highway. Consequently, deforestation in the Amazon could lead to changes in where and how often thunderstorms are formed in the region.

HOW: In a previous section of this presentation, Dr. Avissar compared satellite images and computer models. Using these sources, Dr. Avissar studied different types of data: size and patterns of deforestation in the Amazon and the relationship between existing landscape cover in the United States and thunderstorm formation. Dr. Avissar and his colleagues applied the data from previous models to create a new model that project how thunderstorm formation might change if current deforestation rates continue.

"IT'S FUN, REALLY-JUST FUN!"

WHY: Simulations can be used to make realistic predictions because they are created using data drawn from real-world experiments or observations. Once a model or simulation has been created it is tested to see if can reproduce existing conditions accurately or not. If it can, then the model is considered credible and can be used to make projections about the future. For the experiment discussed in this clip, the real world data entered into the system came from remotely sensed information about atmospheric conditions in relation to landscape cover in the United States and in the Amazon.

SO WHAT: In this clip, Dr. Avissar draws from simulations and models to clarify the relationship between the formation of thunderstorms and change in land cover due to deforestation. The equator is a region of the globe that receives a large amount of direct heat from the sun and has a high percentage of water surface area. As a result, much of the world’s weather patterns originate there. Deforestation in equatorial areas is happening at a rapid rate, so if land cover changes induce changes in equatorial weather, there could be global repercussions.

BIO: Dr. Roni Avissar is currently Dean of the Rosenstiel School of Marine and Atmospheric Science for the University of Miami in Florida. He has a PhD atmospheric science, and his area of expertise is land/atmosphere interactions. He continues to research and publish on the topic of deforestation and hydroclimatological change. At the time of this clip, Dr. Avissar was serving as Chair of the Civil and Environmental Engineering Department at Duke University in North Carolina.
What does deforestation have to do with the weather?

**TAKING THE REINS**

**DISCUSSION QUESTIONS:**
Discuss with a friend or record your thoughts in a journal.

- What is the relationship between deforestation and thunderstorms?
- Why do you think deforestation tends to occur in relationship to highway development?

**QUIZ QUESTIONS:**

**Quiz 1.** What is the spatial scale necessary to be a triggering mechanism for a thunderstorm?

a) from 5km to 100km of heterogeneity  

b) from 1,000km to 5,000km of heterogeneity  

c) from 5m to 150m of heterogeneity  

d) from 1,000m to 5,000m of heterogeneity

**Quiz 2.** According to Dr. Avissar’s talk, which of the following is true about human disturbance of the rainforest?

a) Disturbances tend to occur randomly, far away from each other.  

b) Disturbances tend to spread between 50 to 100 km from the highway.  

c) Disturbances tend to be very short lived.  

d) Disturbances do not impact trees that are left standing.

**GLOSSARY TERM:**
**Heterogeneity**

The quality of being non-uniform. For example, a heterogeneous landscape contains multiple types of land-cover, such as some forested area mixed with some grasslands. An area that only had one type of land cover (all forest) would be *homogeneous*. 

What does deforestation have to do with the weather?

**Taking the Reins: Further Activities**

**Go Beyond:** Science journal

*Journal Activity:* Use your science journal to record thoughts or drawings.

1. Choose one or more of the questions below:
   
   a. If weather prediction is limited to a few weeks, how can climate scientists predict the climate decades into the future?
   
   b. How could weather 1,000s of miles away have an impact on you?

2. Write down or sketch what you think the answer to the question is without looking anything up.

3. Ask a family member, friend, or teacher the same question and write down their answers.

4. What are the common answers you've collected? Write or sketch the common themes/ideas.

5. Devise your own strategy for digging deeper (ask a scientists, check out university and government agency websites like NOAA and NASA, go to the library, design and conduct an experiment, etc.) until you are satisfied that the answer makes sense to you.

6. Summarize what is known and unknown about the subject of the question. Also note what evidence there is in supporting what is known and how the evidence was obtained.

7. Rate the answer you've come up with on a scale of 1 to 10, 1 being weak with lots of uncertainty, 10 being perfect.

**Further Reading:**


Avissar, Roni, David Werth, 2005: Global Hydroclimatological Teleconnections Resulting from Tropical Deforestation. *J. Hydrometeor,* 6, 134–145. doi: