

## Paleoclimate of the Hudson River Valley

*(Based on data from pollen and spore research since the 1950's in the northeastern US, and most recently the research of Dr. Dorothy Peteet, Paleoecologist, Lamont-Doherty Earth Observatory)*

The Hudson Valley region has changed dramatically in the past, and we can use fossilized pollen to understand some of these changes. The area experienced three mountain-building episodes with long periods of erosion and invasion of water from seas that shaped peaks and ridges and deepened the valleys. The oldest bedrock dates back 1.4 billion years, with a large mountain-building episode rivaling the Himalayas taking place 1.2 billion years ago. Since that time, seas have covered the eastern part of the United States, leaving behind fossils of marine creatures, and glaciers covered the area as recently as 16,000 years ago. Sediment has been accumulating throughout that time. Trapped within the sediment are pollen grains from the plants that grew in this area. By looking at the pollen in different sediment layers, we can reconstruct the vegetation changes that have occurred in the region. Since we know what conditions these plants need in order to survive, we can figure out what the past climate in the area has been for the last 16,000 years.

We will look at nine different layers-but the last layer was covered by a glacier, so there are no pollen data from that time. The age of each layer has been established by radiocarbon dating. Scientists from Lamont Doherty Earth Observatory took samples of wetland soils by drilling deep into the Earth and pulling out cores. Each layer of peat or mud has types of pollen from different plant species.

Layer	Time period	Climate	Species found in wetland cores	Check (✓) your layer
1	100-400 years ago	moist and cool	Ragweed, common reed, few oak (due to deforestation), sorrel	
2	400-3000 years ago	moist and colder (Little Ice Age)	Oak and chestnut	
3	3,000-5,000 years ago	warm and dry	Oak and hickory	
4	5,000-7,500 years ago	warm and moist,	Oak and hemlock	
5	7,500-11,500 years ago	Cool and dry	White pine and oak	
6	11,500-12,700 years ago	cold and snowy (younger Dryas cold interval)	Spruce, fir, birch	
7	12,700-15,000 years ago	cold but warming (Bolling-Allerod interval)	Spruce, some fir, oak, white pine	
8	15,000-16,000 years ago	very cold	Tundra: evergreen shrubs, dwarf birch, sedge	
9	Prior to 16,000 years ago	Glaciers present, often as thick as 300 meters leaving behind lakes and forming ridges and moraines.	None-snow and ice present over soils.	