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How ancient pollen can predict our future climate

Ancient pollen grains found in sediment cores dating back thousands of years are helping scientists to shed light on the earth's past and future climates.

Dr Lynne Quick, a palynologist at Nelson Mandela University, who is currently working on the development of new paleoenvironmental records in Southern Africa says there's much more to pesky pollen and fungal spores that wreak havoc on those with allergies.

"Pollen is distinct in two ways. It has a unique shape depending on what plant it comes from, and its outer layer is made of sporopollenin, which is chemically very stable and resistant to microbial decay. In fact, it's one of the most chemically inert organic compounds found on earth and is known as the 'diamond of the plant world'. Sporopolleni preserves pollen grains in ancier deposits and sediments whe almost all other organic materia are reduced to unrecognisabl components.

"When pollen is washed or blow into bodies of water and sinks, the walls remain intact, which allo them to remain preserved i sediment layers in the bottom c lakes, oceans and wetlands. The unique shape enables us to identif what plant species were i abundance at the time the sedimer was deposited and through carbo dating, we can determine the age c the fossilised pollen.

"Knowing what types c vegetation were growing in an are allows us to make inferences abou the climate at that time. This i because plants have bioclimati niches, which means they can onl live and thrive under certai climate and environmenta conditions. Fossil pollen leaves a important fingerprint that can hel us uncover how our climate ha changed over millennia and what may look like in the future," sh explains.

Dr Lynne Quick and her tea extracts sediment from wetlands, i order to analyse the pollen grai that have accumulated over tim This allows researchers to infe compositional changes in pla communities, thereby creatin vegetation histories.

There is a large body of work tha covers the reconstruction c landscapes and environments usin pollen evidence from thousands c years ago of different parts of Sout Africa. Most of the data generate by Dr Quick and other researche are incorporated into climate an bioclimatic models as baselines fc past vegetation changes, which ca also aid in environmenta conservation managemen initiatives.

She says with future climat change, significant shifts i vegetation distributions are likel to occur, which may threaten th high levels of species richness an endemism found within some c SA's unique biomes.

These predictions are based on th outputs of bioclimatic model which require the use o palaeoecological data, such a fossil pollen records, to test th strength of the projections an validate the climate-vegetatio hypotheses inherent within thes models.

Key regions of interest in Sout Africa, include the fynbos (Weste Cape and Eastern Cape) Drakensberg (KwaZulu-Natal grassland (high central plateau c SA and inland areas of KwaZulu Natal and the Eastern Cape) an savanna biomes (Free State, Nort West and Gauteng).