Electricity from trees

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Dr. Rohan Jayaratne said scientists have long-suspected an association between trees and electricity. Now a team of researchers from Queensland University of Technology in Brisbane, Australia, may have finally discovered the link. Credit: Erika Fish

Plants have long been known as the lungs of the earth, but a new finding has found they may also play a role in electrifying the atmosphere.

Scientists have long-suspected an association between trees and electricity but researchers from Queensland University of Technology (QUT), in Brisbane, Australia, think they may have finally discovered the link.

Dr Rohan Jayaratne and Dr Xuan Ling from QUT's International Laboratory for Air Quality and Health (ILAQH), led by Professor Lidia Morawska, ran experiments in six locations around Brisbane, including the Brisbane Forest Park, Daisy Hill and Mt Coot-tha.

They found the positive and negative ion concentrations in the air were twice as high in heavily wooded areas than in open grassy areas, such as parks.

Dr Jayaratne, who is also a member of QUT's Institute of Health and Biomedical Innovation (IHBI), said that natural ions in the air were mainly created by ionisation due to two processes - radiation from the trace gas radon in air and cosmic radiation from space.

Radon is a by-product of the radioactive decay of radium which is present in minute quantities in rocks and is continually exhaled by the ground.

"Because radium is found in rocks and radon is soluble in water, ground water is particularly rich in radon," he said.

"Trees act as radon pumps, bringing the gas to the surface and releasing it to the atmosphere through transpiration - a process where water absorbed by the root system is evaporated into the atmosphere from leaves. This is especially prevalent for trees with deep root systems, such as eucalypts."

The QUT scientists estimated that, in a eucalyptus forest, trees may account for up to 37 per cent of the radon in the air when transpiration rates were highest.

Dr Jayaratne said though there was still a lot more research which needed to be done in relation to the role of ions, the findings, which were published in the journal Environmental Science and Technology, have potentially important implications for the atmosphere, climate and human health.

"Although there is an established link between airborne particles and

human health, the role of ions is largely unknown," he said.

"However, we do know that approximately one-half of the particles that we inhale during normal breathing are retained in our respiratory system and it has been shown that charged particles were more likely to be deposited in the lungs than uncharged particles.

"We do not believe that ions are dangerous - the danger comes from the pollutants. If there are no dangerous particles in the air to attach to the ions there is no risk of ill health."

Provided by Queensland University of Technology