

THE LAKE NYOS GAS BURST

In August 1986 at Lake Nyos, in Cameroon, West Africa, a volcanic crater lake released a large volume of carbon dioxide (CO₂). This was not a volcanic eruption, but a gas burst.

Being denser than air, the CO₂ did not disperse but flowed down into nearby populated valleys resulting in the deaths of about 1700 people.

What happened at Lake Nyos?

Cameroon is situated on the Cameroon Volcanic Line, an area of volcanic activity that makes it susceptible to the release of volcanic CO₂. After degassing from the hot magma, the CO₂ gas is either trapped underground or escapes to the surface. In the case of Lake Nyos, the CO₂ slowly moved into natural pathways feeding into the lake as well as directly into the lake. CO₂ is soluble in water and so dissolved into Lake Nyos.

The lake is very deep and contained a very large volume of stratified or layered water. When these layers become unstable through seasonal turnover, the CO₂ is circulated to upper layers where it is released from the water in non-catastrophic events.

However, Lake Nyos existed in long-term physical and chemical equilibrium and there was no seasonal turnover. These circumstances produced stratified lake waters with very high CO₂ concentrations. Either the addition of simply too much CO₂ (the water was supersaturated in CO₂) or external mechanical forces (underwater land slip or earthquake) caused the equilibrium of the lake to be disturbed.

This disturbance caused the stratified lake layers to mix; the CO₂-rich waters were suddenly exposed to lower pressures and became unstable. This sudden destabilisation caused large amounts of the CO₂ to be released out of the lake as a gas burst.

This event is not the only sudden release of CO₂ from a lake that has been documented. In 1984 a gas burst also occurred at Lake Monoun, Cameroon, only 100km away from Lake Nyos, releasing a large volume of CO₂, fortunately into largely unpopulated areas.

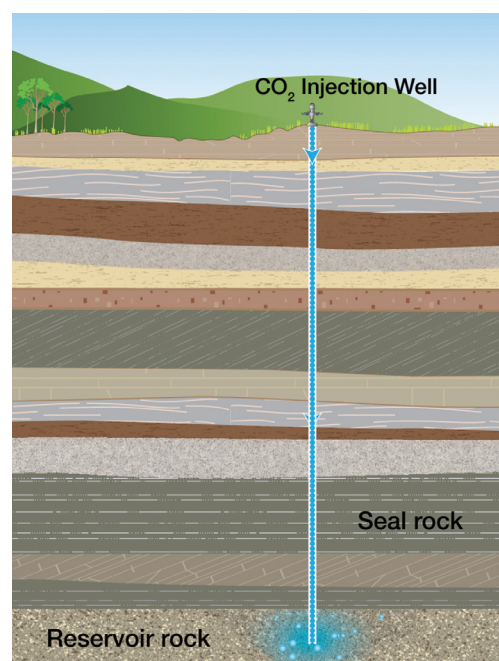
Does the Lake Nyos incident suggest that geological storage of carbon dioxide is unsafe?

The answer is no. Storage sites are carefully characterised, over several years, to ensure they provide safe and permanent storage. Sites are selected that lack any of the readily identifiable natural pathways or the active volcanic activity that is present in Cameroon.

Potential CO₂ storage sites have:

- » simple geology to avoid movement and leakage of CO₂;
- » the depth to maintain the CO₂ as a liquid beneath the Earth's surface (at least 800m);
- » the right type and capacity of permeable rocks to absorb the CO₂; and
- » the necessary rocks or structures to trap or seal in the CO₂.

Large spontaneous releases of many tonnes of CO₂, as happened at Lake Nyos, cannot occur at such sites. Our research to date strongly suggests that in many of Australia's sedimentary basins CO₂ emissions could be safely stored for thousands of years and longer.



Carefully selected sites can provide safe, permanent CO₂ storage.