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# Atmospheric monitoring of geosequestration of carbon dioxide

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The capture of carbon dioxide and subsequent storage in geological formations (geosequestration) is potentially an effective way of reducing $CO_2$ emissions to the atmosphere. Verification that the $CO_2$ remains in storage will be necessary for safety, environmental, regulatory and carbon trading purposes, as well as demonstrating the effectiveness of geosequestration in mitigating climate change. Challenges exist in discriminating possible geosequestration leaks from the highly variable natural atmospheric $CO_2$ and quantifying the flux, especially for slow and diffuse leakage. A number of atmospheric monitoring techniques may be suitable, ranging in scale from flux chambers to micrometeorological methods to continuous atmospheric $CO_2$ measurements combined with transport modeling. Atmospheric techniques provide some advantages in monitoring $CO_2$ storage and will be most useful in conjunction with subsurface monitoring techniques. Tracers of geosequestered gases will also help to attribute and quantify leakage. Application of atmospheric techniques to a demonstration project by the Australian Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) in South Eastern Australia will be discussed.