

SEQUESTRATION OF ATMOSPHERIC CARBON DIOXIDE AS INORGANIC CARBON IN SEMI-ARID FORESTS

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Studies in Israel's semi-arid Yatir forest tracked atmospheric CO₂ transiting the soil. Bicarbonates, originating from tree root exhalation, are depleted and incorporated within the unsaturated zone (USZ) as CaCO₃ calcite. The calcite deposition rate corresponds to 22 mg CO₂ per year per liter of sediment. It stays in place long term and does not re-dissolve in low rainfall semi-arid regions. These regions comprise ~24 million km², ~18% of the global surface area. We extrapolate to the global semi-arid regions, taking 6 m as the global average depth of root respiration, and assuming that Yatir is representative. Therefore, roughly 3 billion tons of CO₂ could potentially be precipitated globally each year in the USZ as calcite, following forestation. This represents ~15% of the present annual increase of 20 billion tons of CO₂ in the atmosphere. We plan next to take additional data at the Ilanot Forest to bolster our data basis. Details of initial studies are available at Catena 173, 93-98, 2019.

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