

KAJIAN SEBARAN KONSENTRASI KARBON DIOKSIDA (CO₂) DALAM TANAH PADA SEBAGIAN KAWASAN KARST JONGGRANGAN

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INTISARI

Karbon dioksida (CO₂) merupakan suatu senyawa kimia yang berperan dalam perubahan iklim global. Sifat senyawa gas karbon dioksida (CO₂) pada tanah yang dinamis mengindikasikan adanya variasi besarnya penyerapan karbon dan pelarutan batuan karbonat di bentanglahan karst. Penelitian dilakukan di sebagian Kawasan Karst Jonggrangan. Tujuan dari penelitian ini yaitu (1) Mengukur dan menganalisis sebaran spasial, temporal, dan vertikal konsentrasi gas karbon dioksida (CO₂) dalam tanah pada penutup lahan kebun campuran dan hutan pinus; (2) Menganalisis hubungan antara kelembapan tanah, suhu tanah, tekstur tanah, dan bahan organik tanah terhadap variasi konsentrasi karbon dioksida (CO₂) dalam tanah.

Data penelitian dikumpulkan dari profil tanah pada penutup lahan kebun campuran dan hutan pinus. Pengambilan data secara vertikal dilakukan pada profil tanah dengan kedalaman 20 cm, 40 cm, dan 60 cm dengan variasi temporal berdasarkan musim kemarau dan musim penghujan. Data yang diukur secara langsung di lapangan meliputi data kelembapan tanah, suhu tanah, dan konsentrasi karbon dioksida (CO₂) tanah. Data penelitian seperti tekstur tanah dan bahan organik tanah diketahui dari hasil uji sampel tanah di laboratorium. Data penelitian dianalisis dengan analisis statistik deskriptif.

Hasil penelitian menunjukkan jika konsentrasi karbon dioksida (CO₂) mengalami fluktuasi yang besar terjadi di penutup lahan kebun campuran, yaitu sebesar 2000 ppm – 5000 ppm. Konsentrasi karbon dioksida (CO₂) mengalami peningkatan pada musim penghujan karena meningkatnya kelembapan tanah dan adanya *growing season*. Konsentrasi karbon dioksida (CO₂) secara vertikal mengalami tren yang meningkat pada kedalaman tanah 40 cm dan kembali menurun pada kedalaman tanah 60 cm. Hasil perbandingan menunjukkan kelembapan tanah berbanding lurus dengan konsentrasi karbon dioksida (CO₂), sedangkan bahan organik memiliki hubungan yang berbanding terbalik. Faktor suhu tanah tidak menunjukkan adanya pengaruh terhadap konsentrasi karbon dioksida (CO₂), sedangkan faktor tekstur tanah berpengaruh di beberapa lokasi penelitian.

Kata kunci: bahan organik tanah, karst, kelembapan tanah, konsentrasi karbon dioksida (CO₂), suhu tanah, tekstur tanah

STUDY OF CARBON DIOXIDE (CO₂) CONCENTRATION DISTRIBUTION IN THE SOIL AT SPECIFIC SITES OF JONGGRANGAN KARST ZONE

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ABSTRACT

Carbon dioxide (CO₂) is one of the main compounds impacting global climate changes. CO₂ as the dynamic compound in the soil indicates the variety of carbon absorption and carbonate stone dissolution on the karst landscape. The research was done at some places at Jonggrangan Karst zone. This research aimed to (1) measure and analyze the variety of CO₂ concentration spatially, temporally, and vertically in the soil at a mixed vegetation area and pinewood forest; (2) to analyze the relationships among soil moisture, soil temperature, soil texture, and soil organic matter towards CO₂ concentration distribution in the soil.

The research data was collected from soil profiles at mixed vegetation areas and pinewood forest land cover. The data was collected vertically at 20 cm, 40 cm, and 60 cm of the soil depth and temporally in the dry season and rainy season. Some data such as soil moisture, soil temperature, and CO₂ concentration were collected directly and the rest such as soil texture and soil organic matter were examined by laboratory tests. Data analysis was performed and explained statistically descriptive.

The research results show the CO₂ concentration has a high fluctuation in the mixed vegetation areas within amount 2000 ppm – 5000 ppm. The concentration is highest in the rainy season because of higher soil moisture and the growing season. The concentration is vertically higher at 40 cm depth and lower at 60 cm depth. The correlation results show that the soil moisture is directly proportional to CO₂ concentration, whereas the soil organic matter to CO₂ correlation being vice versa. The soil temperature seems to have no influence on the CO₂ concentration and soil texture influences at some parts of the research area.

Keywords: carbon dioxide (CO₂) concentration, karst, soil moisture, soil organic matter, soil temperature, soil texture