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**Total carbon stocks and carbon accumulation in living tree biomass in forest ecosystems of Turkey**

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**Abstract:** In this study, the carbon stocks of forests of Turkey were examined by taking the national forest inventory completed in 2004 as a basis. Furthermore, the annual accumulations of carbon in the above- and below-ground biomass of Turkey were also investigated according to the gain-loss methods of "Agriculture, Forestry and Other Land Use" (AFOLU), published in 2006. The results of estimates showed that the total stock in all carbon pools (above- and below-ground, dead wood, litter, and soil) in the forests of Turkey was 2251.26 Tg C in 2004. Of that total carbon stock, 74.78% was in soil, 21.32% in living tree biomass, and 3.90% in litter and dead wood. It was also found that the annual biomass carbon accumulation increased from 2.20 Tg C year<sup>-1</sup> in 1990 to 6.82 Tg C year<sup>-1</sup> in 2005 (an average increase of 4.50 Tg C year<sup>-1</sup>), according to the gain-loss method. In the productive forests of Turkey, the carbon density in above- and below-ground biomass is 41.66 Mg ha<sup>-1</sup>, and this is slightly lower than that in the forests of Europe, which is 43.90 Mg ha<sup>-1</sup> according to the United Nations Economic Commission for Europe and the Food and Agriculture Organization of the United Nations (UN-ECE/FAO). The forests in Turkey absorbed 7.99% of anthropogenic CO<sub>2</sub> emissions, which was 312.31 Tg CO<sub>2</sub> year<sup>-1</sup> in 2005. In order to increase the amount of carbon accumulated in the forest biomass of Turkey, first of all, the illegal cuttings need to be reduced. Furthermore, the degraded forests, making up about half of the forest area in Turkey, must be rehabilitated, and to increase carbon stock, the concept of carbon management must be adapted to the forestry sector.

**Key words:** AFOLU, carbon accumulation, carbon stock, forest, Turkey

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