

Investigation of the Relationship between Satellite Retrieval CO₂ Concentration and NDVI over IRAN

Seyed Mohsen Mousavi¹, Samereh Falahatkar^{1*}, Manochehr Farajzadeh²

The global annual mean atmospheric carbon dioxide (CO₂) concentration has increased since the industrial revolution from 280 ppm to current value of about 390 ppm, which caused widespread concern in the international community. Among the greenhouse gases, CO₂ has been introduced as most important anthropogenic greenhouse gas. Human activities such as deforestation, land use and land cover change, forest degradation, industrialization and consumption of fossil fuels have increased the concentration of CO₂ in the atmosphere, which have disrupted the global natural C cycle. Greenhouse Gases Observation Satellite (GOSAT) measures the concentrations of CO₂ and CH₄ in the atmospheres column from the earth's surface to the upper atmosphere. In this research, GOSAT TANSO-FTS level 2 data and MOD13Q1 of MODIS product were used to investigate the relationship between XCO₂ and NDVI for 2013 year in Iran. The NDVI is used to construct seasonal and temporal profiles of vegetation activity enabling inter-annual comparisons of these profiles. Therefore, NDVI was utilized for the investigation of CO₂ concentration in different land covers. According to the results, the strongest correlation was found between monthly XCO₂ values and NDVI value for spring season. A weak correlation was found between XCO₂ and NDVI value for autumn season. In other words, the highest correlation coefficient to lowest value observed in spring, winter, summer and autumn was 0.756, 0.472, 0.428, and 0.341 respectively. The southern Iran is located in lower latitude and has warmer weather than northern Iran in autumn and

1. Faculty of Natural Resource and Marine Science, Tarbiat Modares University, Noor, Iran

2. Department of Geography, University of Tarbiat Modares, Tehran, Iran

*Corresponding author.

E-mail addresses: samereh.falahatkar@modares.ac.ir (S.Falahatkar), <tel:00981144553101>,
Fax:00981144553909

winter, so, the NDVI values are quite low in higher latitude than lower latitude in winter. The most number of XCO₂ column is located in southern Iran in winter, they include higher NDVI values and demonstrate higher correlation coefficient than summer and autumn.