

Analyzing Methane (CH₄) Emissions in Rice Fields Using Satellite Data (Case study: Suphan Buri Province, Thailand)

Petjaraj Techakriangkaikul^{1*}, Nattharika Khamhiang², Phanuwat Jansri²
and Jongphon Chantharangsee³

¹Knowledge Transfer Officer, International Academic Network Division,
Geo-Informatics & Space Technology Development Agency (Public Organization), Thailand

²Undergraduate students, Faculty of Industrial Technology, Uttaradit Rajabhat University, Thailand

³ Undergraduate students, Faculty of Computer Science and Information Technology,
Rambhai Barni Rajabhat University, Country

*¹petjaraj@gistda.or.th, ²u64046561106@uru.ac.th, ²u64046561116@uru.ac.th,
³6414631011@rbru.ac.th

ABSTRACT

The purposes of this study were to analyze methane (CH₄) emissions in rice fields in Suphan Buri Province, Thailand. By using time series data between 2019 - 2023 and geospatial technology, we can study the relationship between water management and methane (CH₄) emissions. By using high-resolution satellite data from sentinel-2 to classify rice field areas with the Random Forest (RF) Algorithm, we can monitor and measure the amount of methane (CH₄) emissions in the atmosphere. Moreover, using the Google Earth Engine (GEE) platform to analyze data. The results of this study reveal that it was possible to clearly measure the values of methane (CH₄) emissions in rice fields. From the results, methane (CH₄) emissions values can be divided into 4 levels, with the highest methane (CH₄) emissions being between 1960 - 1980 parts per billion (ppb, 10⁻⁹), and the lowest being between 1900 - 1920 parts per billion (ppb, 10⁻⁹). This corresponds to the period for water allocation for rice cultivation. Applying satellite data and geospatial technology for effective monitoring and analysis of methane (CH₄) emissions. This can be used in the formulation of policies and strategies towards climate change management in Thailand. Furthermore, this can be applied to water and rice fields management planning to mitigate environmental impact and promote sustainable agriculture.

Keywords: Methane (CH₄), Emissions, Rice Fields, Satellite Data