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# Analysis Of Climate Types In Several Regencies In South Sumatra Based On The Schmidt–Ferguson And Oldeman Classifications

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**Abstract**

Rainfall-based climate classification is important to describe regional climate characteristics and support agricultural planning in tropical regions. This study aims to identify and map climate types in seven districts/cities in South Sumatra Province using the Schmidt–Ferguson and Oldeman classifications based on rainfall data for the 1995–2025 period. Monthly rainfall data from seven BMKG rainfall stations is used as the primary dataset, while Global Satellite Mapping of Precipitation Version 8 (GSMaP V8) data is used to fill in missing data (gap filling). Gap filling is carried out by extracting GSMaP data using the nearest-neighbor method. The gap filling process, integration with rainfall station observation data, and the climate classification process use the Python programming language on the Google Colab platform. The Schmidt–Ferguson classification is based on the ratio between dry months (BK) and wet months (BB), whereas the Oldeman classification considers the sequence of wet months (BB) and dry months (BK). The results of the study showed that the Schmidt–Ferguson classification produces Very Wet and Wet climate types. The Very Wet climate type is found in Musi Banyuasin Regency, East OKU Regency, South OKU Regency, and Pagar Alam City, while Ogan Ilir Regency, OKI Regency, and Muara Enim Regency are classified as Wet. The Oldeman classification results in



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climate type CI in Musi Banyuasin Regency, Muara Enim Regency, South OKU Regency, and Pagar Alam City, type C2 in East OKU Regency, and type D2 in Ogan Ilir Regency and OKI Regency. Spatially, wetter conditions are generally found in the southern and southwestern parts of South Sumatra, while the central and eastern lowland areas show shorter wet periods.

**Keywords: climate classification; rainfall; South Sumatra**

## INTRODUCTION

Climate change affects various sectors of life, including the agricultural sector through changes in temperature, rainfall patterns and an increase in extreme climate events. Usman et al. (2024) stated that the agricultural is among the sectors vulnerable to climate change, while Tarmizi et al. (2019) showed that climate change is associated with changes in the frequency and intensity of rainfall. The Intergovernmental Panel on Climate Change (IPCC) reported an average temperature increase of 1.1°C due to global warming (2023). Climate change also contributes to water-scarcity problems because it negatively affects the conservation and reliability of rainwater resouces (Kisakye et al., 2018).

As a tropical country, Indonesia is highly vulnerable to climate change (Wurarah, 2024). Ruminta et al. (2018) reported that indications of climate change can be observed from increasing air temperatures, changes in rainfall patterns, and shifts in climate classification. Weather and climate have a major influence on people's lives (Wahid & Usman, 2017). Rainfall is the primary source of water in the agricultural sector (Mahubessy, 2014). Climate classification is needed for each region (Anam, 2022) to simplify climate diversity so that it can be optimally utilized for agricultural planning and natural resource management (Laimeheriwaet al., 2019).

The Schmidt–Ferguson and Oldeman classification methods considered most suitable for use in Indonesia (Sasminto et al., 2014). The Schmidt–Ferguson classification is a refinement of the Mohr system and classifies climates based on the ratio (Q) between the average number of dry months (rainfall <60 mm/month) and the average number of wet months (rainfall >100 mm/month), resulting in eight climate types from very wet to extremely dry (Faisol & Paga, 2022). This classification has been widely used for plantation and forestry crop planning (Laimeheriwa et al., 2019). Meanwhile according to Winarno, Oldeman's classification places more emphasis on food crop agriculture by using consecutive wet month (rainfall >200 mm) and dry month (rainfall


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<100 mm) criteria, with thresholds that consider rainfall probability, effective rainfall, and the water requirements of rice and secondary crops (2019).

In climate classification analysis, the availability of accurate and continuous rainfall data is an important requirement in many fields (Pratama et al., 2022). Incomplete rainfall data can reduce the accuracy of climate analysis and substantially affect decision-making in various sectors such as disaster mitigation, agriculture, and infrastructure development (Schafer & Graham, 2002). The limited number of climate stations with sufficiently long observation records is a constraint on climate analysis (Alfiandy et al., 2021). To overcome the limitations of surface observation data, satellite-derived rainfall data have increasingly been developed over past two decades (Aonashi, 2009). Global Satellite Mapping of Precipitation (GSMaP) is a satellite-based rainfall data product that can be used to fill in the gaps in rainfall data. According to Fatkhuroyan (2018), GSMaP has good performance for estimating rainfall over Indonesian region.

Previous climate classification studies have used a variety of data sources and lengths. Ruminta et al. (2018), Ridwan et al. (2023), and Sasminto et al. (2014) examined climate classification based on Schmidt–Ferguson and Oldeman using rainfall data with data periods of 3, 9, and 10 years, respectively. Meanwhile, Faisol et al. (2022) and Ramadhan et al. (2024) identified climate classification based on Schmidt–Ferguson and Oldeman using CHIRPS data for 11 and 43 years. This study takes a different approach by retaining rainfall data from rainfall stations as the primary source and GSMaP data as an alternative data source to fill the gap in rainfall data so that the resulting information is still based on direct observation data but has data with a long time series.

South Sumatra has diverse topography, with extensive plains and the Bukit Barisan mountain range in the west. These geographic differences are accompanied by variations in rainfall between regions. Based on these conditions, this study aims to identify Schmidt–Ferguson and Oldeman climate types in seven regencies/cities in South Sumatra Province based on rainfall data from 1995–2025 and their spatial distribution.

## RESEARCH METHODS

### Research Design and Study Area

The research method is quantitative computational with a climatological and spatial approach. This approach was used to analyze numerical rainfall data at seven BMKG rainfall stations representing seven regencies/cities in South Sumatra Province. The data period used was


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31 years (1995–2025). This period was chosen because it is based on climatological standards recommended by the World Meteorological Organization (WMO) so that the analyzed rainfall characteristics can describe long-term and representative climate conditions.

This study used primary monthly rainfall data from observations at BMKG rainfall stations in South Sumatra Province. Seven rainfall stations (Table 1) were the result of a data inventory, with a missing data percentage of <10%. Each rainfall station has coordinates that will be used as reference points for GSMaP data collection.

The supplementary data used is the daily GSMaP version 8 (GSMaP V8) data of the NRT type, which can be downloaded from the official JAXA portal (https://sharaku.eorc.jaxa.jp/GSMaP). GSMaP has a spatial resolution of 0.1° x 0.1°, or approximately 10 km, allowing it to represent rainfall distribution in detail on a regional scale, including in areas of Indonesia with complex topography (Idris et al., 2025). Suryanto and Krisbiyantoro (2024) explained that GSMaP V8 is the most accurate rainfall satellite product in the Indonesian maritime island region and is suitable for use as complementary data for surface observations. The results of research by Fatkhuroyan and Trinah Wati (2018) reported that the GSMaP product has an average accuracy level of 82.6%, a daily average error (ME) value of 0.16 and an RMSE of 17.44 mm. This data is used only to fill in the gaps in rainfall data from rainfall stations.

**Table 1. Rainfall Stations**

| Rainfall Stations | Regency/City | Latitude | Longitude |
|---|---|---|---|
| SMPK Sekayu | Musi Banyuasin Regency | 2.90° S | 103.84° E |
| SMPK Indralaya | Ogan Ilir Regency | 3.23° S | 104.66° E |
| SMPK Belitang | East OKU Regency | 4.11° S | 104.65° E |
| Simpang Campang | South OKU Regency | 4.50° S | 103.77° E |
| SMPK Kayu Agung | OKI Regency | 3.40° S | 104.82° E |
| Muara Enim | Muara Enim Regency | 3.67° S | 103.77° E |
| Gunung Dempo | Pagar Alam City | 4.03° S | 103.19° E |


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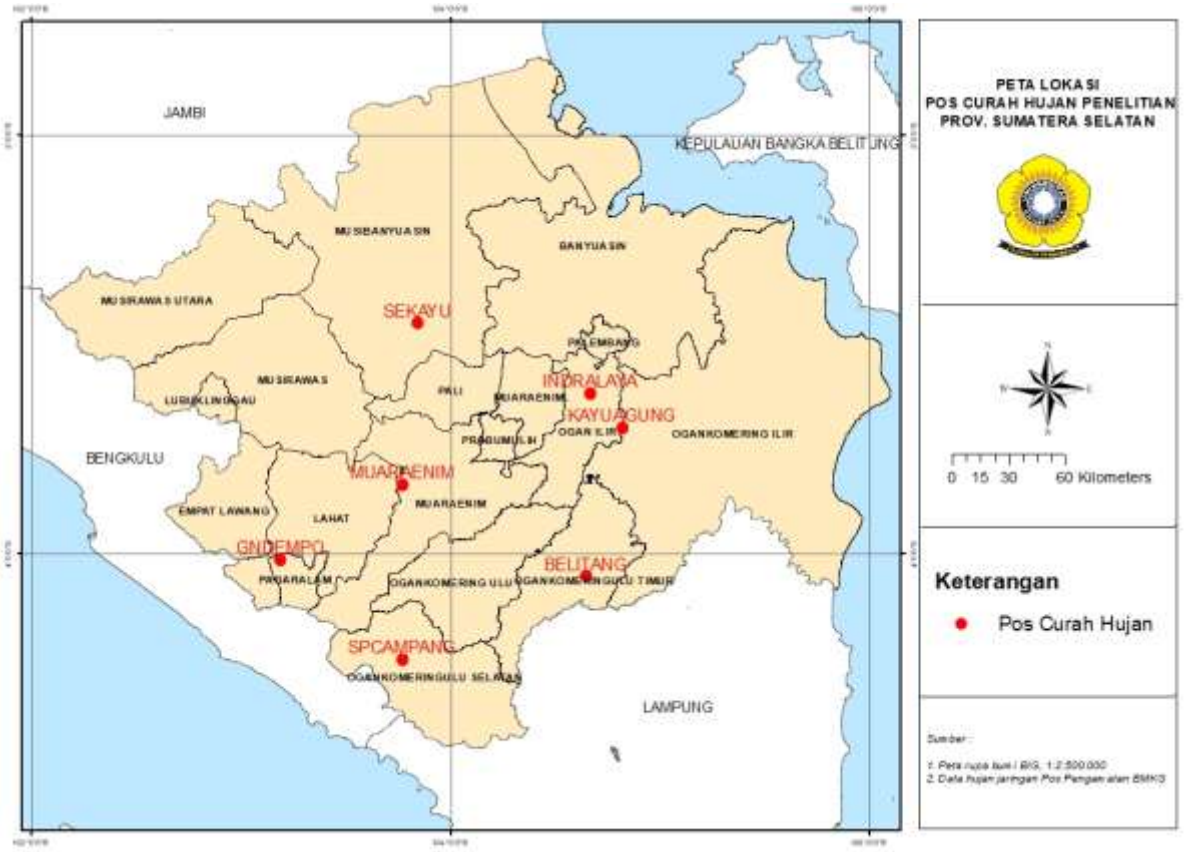



**Figure 1. Map of Rainfall Stations Location**

**Data Quality Control and Gap Filling**

Quality Control is performed by checking the completeness of the monthly data at each rainfall station. Months with complete observation data are retained as the primary data. When observation data is unavailable, GSMaP data is used. Daily GSMaP data in NetCDF (Network Common Data Form) format is extracted from the grid nearest to each station coordinate using the nearest neighbor approach. The extracted data is then accumulated into monthly rainfall data. The GSMaP data extraction process utilizes the xarray library to read NetCDF data, pandas to process tabular data, and os and glob to manage directories and automatically locate files.

After the GSMaP data extraction process is complete, the extracted data is merged with the observed rainfall data. A hierarchical merging procedure is applied. Observational data is used whenever available, while GSMaP data is used only when the observational data is missing. Thus,



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GSMaP data is used as a supplementary data source, not as a replacement for observed data. Data extraction and merging process is performed using the Python programming language on the Google Colab platform.

**Climate Classification and Spatial Analysis**

In the Schmidt–Ferguson climate classification method, months with rainfall >100 mm are categorized as wet months (BB), rainfall of 60-100 mm as humid months (BL), and rainfall <60 mm as dry months (BK). According to Lakitan (2022), the Schmidt–Ferguson climate classification is determined using the Q value calculated by the following equation:

$$Q = \frac{\text{Average Dry Months (BK)}}{\text{Average Wet Months (BB)}} \text{ X } 100\%$$

Based on the Q value, Indonesian has 8 climate types, as follows:

**Table 2. Schmidt-Ferguson Climate Classification**

| No. | Climate Type | Criteria | Vegetation |
|---|---|---|---|
| 1 | Very Wet | 0 < Q < 14.3% | Tropical rainforest |
| 2 | Wet | 14.3% < Q < 33.3% | Tropical rainforest |
| 3 | Moderately wet | 33.3% < Q < 60% | Jungle |
| 4 | Moderate | 60% < Q < 100% | Seasonal forest |
| 5 | Moderately dry | 100% < Q < 167% | Savannah forest |
| 6 | Dry | 167% < Q < 300% | Savannah forest |
| 7 | Very Dry | 300% < Q < 700% | Forest of reeds |
| 8 | Very Dry | 700% < Q | Forest of reeds |

Meanwhile, Oldeman's climate classification uses different monthly rainfall thresholds because it is oriented towards agroclimatic conditions. According to Oldeman, months with rainfall >200 mm are categorized as wet month (BB), rainfall of 100-200 mm as humid months (BL), and rainfall <100 mm as dry months (BK) (Faisol & Paga 2022). The main climate zone is determined by the length of consecutive wet months, whereas the subtype is determined by the length of consecutive dry months. According to Winarno (2012), the climate zones (Table 3) and their climate interpretation (Table 4) can be used to determine climate types and its corresponding interpretation.


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**Table 3. Oldeman Climate Classification (Winarno, 2012)**

| Zone | Climate Type | Wet Month | Dry Month |
|---|---|---|---|
| A | A1 | 10-12 months | 0-1 months |
| | A2 | 10-12 months | 2 months |
| B | B1 | 7-9 months | 0-1 months |
| | B2 | 7-9 months | 2-3 months |
| | B3 | 7-9 months | 4-5 months |
| C | C1 | 5-6 months | 0-1 months |
| | C2 | 5-6 months | 2-3 months |
| | C3 | 5-6 months | 4-6 months |
| | C4 | 5-6 months | 7 months |
| D | D1 | 3-4 months | 0-1 months |
| | D2 | 3-4 months | 2-3 months |
| | D3 | 3-4 months | 4-6 months |
| | D4 | 3-4 months | 7-9 months |
| E | E1 | 0-2 months | 0-1 months |
| | E2 | 0-2 months | 2-3 months |
| | E3 | 0-2 months | 4-6 months |
| | E4 | 0-2 months | 7-9 months |
| | E5 | 0-2 months | 10-12 months |

**Table 4. Interpretation of Oldeman's Climate Types**

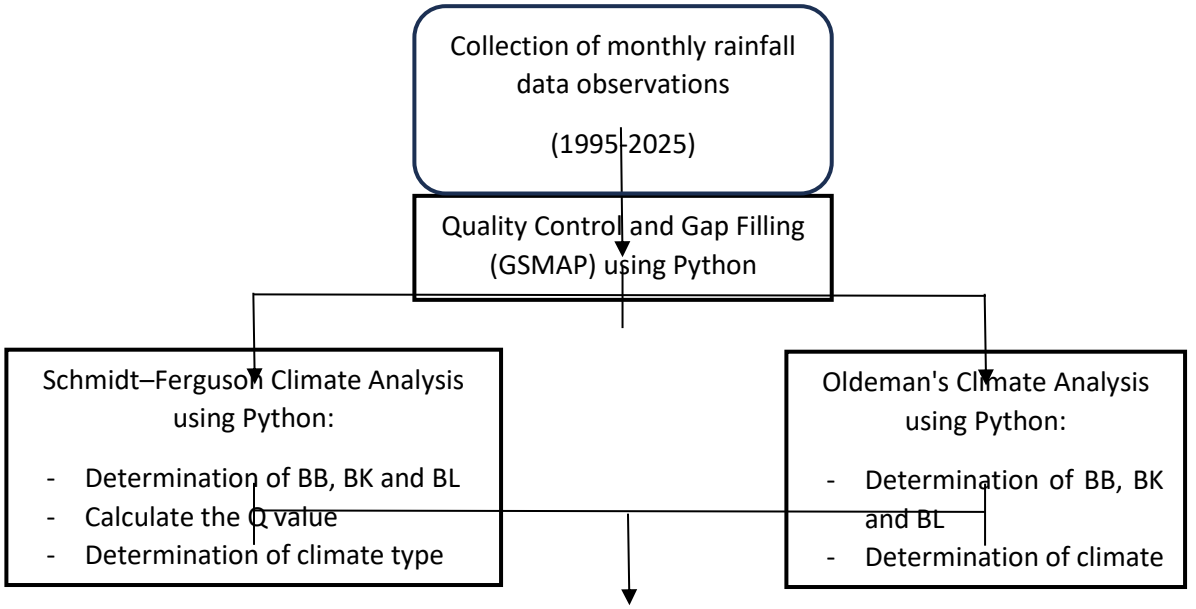
| Climate Type | Interpretation |
|---|---|
| A1, A2 | Suitable for continuous rice cultivation, although production may be lower because the solar radiation flux density is generally low throughout the year. |
| B1 | Suitable for continuous rice cultivation with appropriate planning of the begining of planting season, high production can be achieved when harvesting occurs during the dry season |
| B2 | Rice Can be planted twice a year with short-duration varieties and a short dry season is sufficient for secondary crops. |
| C1 | Rice can be planted once and secondary crops twice a year. |


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| | |
|---|---|
| C2, C3 | Rice can be planted once a year and secondary crops twice a year. However, secondary crops planting must be scheduled carefully taken so that it does not coincide with the dry months. |
| D1 | Short-duration rice can be planted once and production is usually high because solar radiation flux density is high during the secondary crops planting period. |
| D1, D2, D4 | Only one rice crop or one secondary crop is generally possible per year, depending on the availability of irrigation water. |
| E | These area are generally too dry, only one secondary crop may be possible, depending on rainfall. |

The Schmidt–Ferguson and Oldeman climate classification process was carried out using the Python programming language on the Google Colab platform with the Pandas library used to read, process, and save data in CSV format. The input data consisted of monthly rainfall files resulting from the gap filling process after observed and GSMaP data has been combined to produce a more complete time series. The program output is the climate type for each research area in CSV file format.

The classification results at each station are linked to the corresponding regency/city and then mapped using a Geographic Information System (GIS). The maps are used to examine spatial patterns of climate types and compare conditions among regions.





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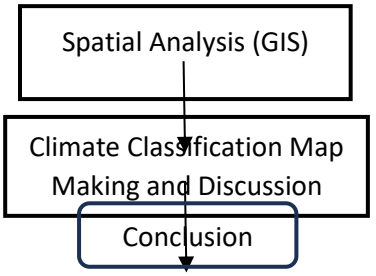



**Figure 2. Research Flowchart**

## RESULTS AND DISCUSSION

### Data Completeness and Gap Filling

Examination of the 31 year data (Table 5) shows that each rainfall station should contain 372 monthly values. Of the 2,604 monthly records expected across seven rainfall stations, 2,435 data or 93.5% are obtained from observations, while 169 data or 6.5% required supplementation using GSMaP V8. The highest level of data completeness was recorded at the SMPK Sekayu rainfall station with 360 months of observation data (96.8%), whereas SMPK Indralaya and Gunung Dempo each had 337 months of observation data (90.6%). The number of missing at seven rainfall stations was below the 10% threshold established during data selection and therefore still met the minimum requirements for imputation method without substantially altering the representation of the original data (Widyawati et al., 2025).

Rainfall data completeness (Figure 3) is high value at most rainfall stations during 1995–2001 and after 2018, as indicated by the predominance of green color. Several stations have years with 0% (zero) data availibity, including Gunung Dempo, Muara Enim, Kayu Agung, Simpang Campang, and Indralaya station. Gunung Dempo station even experienced missing data for two consecutive years, from 2002 to 2003. Meanwhile, the SMPK Sekayu recorded its the lowest data availability, approximately 42%, in 2002.

A much larger proportion of observational data than replacement data is important because the classification results to remain representative of surface measurement conditions. GSMaP is used only to restore continuity during months with missing obeservations. In climate classification, even one or two missing months can affect the number of wet and dry months, particularly in the Oldeman classification, which considers the sequence of months. Therefore,


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the gap-filling process is not merely intended to complete the data table but also toensures that seasonal sequences can be analyzed in their entirety.

**Table 5.Availability of Monthly Rainfall Data for 1995-2025**

| Rainfall Stations | Regency /City | Observation Data (Month) | GSMaP Data (Month) | Percentage of Observations (%) | GSMaP Percentage (%) |
|---|---|---|---|---|---|
| SMPK Sekayu (S) | Musi Banyuasin | 360 | 12 | 96.8 | 3.2 |
| SMPK Indralaya (I) | Ogan Ilir | 337 | 35 | 90.6 | 9.4 |
| SMPK Belitang (B) | East OKU | 355 | 17 | 95.4 | 4.6 |
| Simpang Campang (SC) | South OKU | 342 | 30 | 91.9 | 8.1 |
| SMPK Kayu Agung (KA) | OKI | 359 | 13 | 96.5 | 3.5 |
| Muara Enim (ME) | Muara Enim | 345 | 27 | 92.7 | 7.3 |
| Gunung Dempo | Pagar Alam | 337 | 35 | 90.6 | 9.4 |
| **Total** | | **2,435** | **169** | **93.5** | **6.5** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1995 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1996 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1997 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1998 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1999 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2000 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2001 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2002 | 42 | 75 | 100 | 92 | 100 | 100 | 0 |
| 2003 | 75 | 8 | 25 | 33 | 100 | 33 | 0 |



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| | S | I | B | SC | KA | ME | GD |
|---|---|---|---|---|---|---|---|
| 2004 | 100 | 0 | 92 | 100 | 100 | 100 | 58 |
| 2005 | 100 | 100 | 83 | 50 | 100 | 83 | 83 |
| 2006 | 100 | 100 | 100 | 100 | 100 | 100 | 83 |
| 2007 | 100 | 100 | 100 | 0 | 100 | 100 | 100 |
| 2008 | 100 | 100 | 100 | 75 | 100 | 100 | 100 |
| 2009 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2010 | 100 | 100 | 100 | 100 | 92 | 100 | 100 |
| 2011 | 100 | 92 | 100 | 100 | 0 | 58 | 100 |
| 2012 | 100 | 33 | 100 | 100 | 100 | 0 | 83 |
| 2013 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2014 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2015 | 83 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2016 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2017 | 100 | 100 | 58 | 100 | 100 | 100 | 100 |
| 2018 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2019 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2020 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2021 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2022 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2023 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2024 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2025 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Figure 3. Completeness of Monthly Rainfall Data (%) for 31 Years**

**Schmidt–Ferguson Climate Classification**

The Q value at the seven research locations (Table 6) ranged from 8.5 to 26.9%. Simpang Campang station in South OKU Regency had the lowest Q value, at 8.5%, with 316 wet months (BB) and 27 dry months. This was followed by Gunung Dempo station in Pagar Alam City at 10.6%, SMPK Sekayu in Musi Banyuasin Regency at 11.5% and SMPK Belitang in East OKU Regency at 13.7%. The Q values at these four locations are below 14.3%, placing them as a Very Wet climate type associated with tropical rainforest vegetation (Laimeheriwa et al., 2019).



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The highest Q value, 26.9%, occurs at the Muara Enim rainfall station in Muara Enim Regency, which also has the highest number of dry months (BK), namely 73. This is followed by SMPK Indralaya in Ogan Ilir Regency at 21.8% and SMPK Kayu Agung in Ogan Komering Ilir (OKI) Regency at 21.2%. All three are classified as Wet climates, associated with tropical rainforest vegetation (Ridwan et al., 2023). Tropical rainforests are a type of forest found in areas with relatively high monthly rainfall (Ruqayah et al., 2023).

The Q value range, which is all below 33.3%, indicates the overall dominance of wet conditions in the study area. Nevertheless, differences within this range remain important. Muara Enim, Ogan Ilir, and OKI Regencies have a higher percentage of dry months than South OKU Regency, Musi Banyuasin, East OKU and Pagar Alam City. This reflects the difference in the frequency of dry and wet months over a long period. The Schmidt–Ferguson classification aims to determine the characteristics of a region's wetness as a general representation of climate that can influence community activities (Ruqoyah et al., 2023).

**Table 6. Schmidt–Ferguson Climate Classification Results**

| Rainfall Stations | Regency/City | BB | BK | Q (%) | Climate Type |
|---|---|---|---|---|---|
| SMPK Sekayu | Musi Banyuasin | 305 | 35 | 11.5 | Very Wet |
| SMPK Indralaya | Ogan Ilir | 266 | 58 | 21.8 | Wet |
| SMPK Belitang | East OKU | 292 | 40 | 13.7 | Very Wet |
| Simpang Campang | South OKU | 316 | 27 | 8.5 | Very Wet |
| SMPK Kayu Agung | OKI | 273 | 58 | 21.2 | Wet |
| Muara Enim | Muara Enim | 271 | 73 | 26.9 | Wet |
| Gunung Dempo | Pagar Alam | 311 | 33 | 10.6 | Very Wet |

**Oldeman Climate Classification**

Oldeman's classification produced more detailed climate variations. Four study areas are classified as C1 : Musi Banyuasin, South OKU, Muara Enim, and Pagar Alam. In climate type C1, the wet period lasts approximately 5-6 months, with a dry season of 0-1 month. East OKU Regency is classified as C2, although the number of wet months places it in zone C but the dry period is longer, at 2-3 months. Meanwhile, Ogan Ilir and OKI Regencies are classified as climate type D2, with 3-4 wet months and 2-3 consecutive dry months.


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For the agricultural sector, climate type C1 provides greater flexibility in determining the beginning of the planting season than to C2 and D2 because its consecutive dry months is relatively short. Meanwhile, in climate type C2, the timing of second planting must take into account the onset of the dry months. Meanwhile, irrigation or other supplementary water sources is crucial for areas with climate type D2 because the wet periode is shorter. This interpretation is consistent with the original purpose of Oldeman's classification, which relates rainfall distribution to crop water requirements and cropping patterns (Anam et al., 2023).

**Table 7. Oldeman Climate Classification Results**

| Rainfall Stations | Regency/City | Average month | | zone | Classification | | Climate Type |
|---|---|---|---|---|---|---|---|
| | | BB | BK | | BB | BK | |
| SMPK Sekayu | Musi Banyuasin | 5.45 | 1.16 | C | 5-6 months | 0-1 months | C1 |
| SMPK Indralaya | Ogan Ilir | 3.90 | 2.71 | D | 3-4 months | 2-3 months | D2 |
| SMPK Belitang | East OKU | 5.58 | 2.13 | C | 5-6 months | 2-3 months | C2 |
| Simpang Campang | South OKU | 5.97 | 1.13 | C | 5-6 months | 0-1 months | C1 |
| SMPK Kayu Agung | OKI | 4.19 | 2.39 | D | 3-4 months | 2-3 months | D2 |
| Muara Enim | Muara Enim | 5.10 | 1.81 | C | 5-6 months | 0-1 months | C1 |
| Gunung Dempo | Pagar Alam | 5.74 | 0.94 | C | 5-6 months | 0-1 months | C1 |

**Spatial Pattern and Agroclimatic Implications**

The Schmidt–Ferguson and Oldeman classification results show spatial variations in climate conditions in seven research areas in South Sumatra Province. Based on the Schmidt–Ferguson classification (Figure 4), the research areas are divided into two main climate types, Very Wet and Wet. Musi Banyuasin Regency, East OKU, South OKU, and Pagar Alam City are classified


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as Very Wet climate type, whereas Ogan Ilir, OKI, and Muara Enim Regency are classified as Wet climate type. Meanwhile, the Oldeman classification (Figure 5) produces three agroclimate types, namely C1, C2, and D2. Type C1 is found in Musi Banyuasin Regency, South OKU, Muara Enim, and Pagar Alam City; type C2 is found in East OKU Regency; while type D2 is found in Ogan Ilir and OKI Regency.

Spatially, the southern and southwestern regions, particularly Pagar Alam City and South OKU Regency, exhibit wetter climate conditions. Climatologically, these conditions can be associated with the Bukit Barisan Mountains range extending along western Sumatra Island. Orographic lifting of moist air over elevated terrain can increase the likelihood of cloud formation and orographic rainfall (Lesik et al., 2020). Elevation is one of the important climatic controls in tropical regions (Tadjang, 1992).

On the other hand, Ogan Ilir and OKI Regencies, located in the central and eastern lowlands, show shorter wet periods according to Oldeman's classification. Geographically, both areas are dominated by lowlands, extensive swamps, and areas relatively close to eastern coast of Sumatra. Their lower topography means that orographic uplift is less influential than in the Bukit Barisan region. Consequently, rainfall distribution is more strongly influenced by regional and seasonal atmospheric dynamics (Lestari et al., 2025).

Musi Banyuasin Regency, located in the western part of the province, is classified as a Very Wet climate type according to Schmidt–Ferguson and as C1 according to Oldeman. Similarly, East OKU is classified as Very Wet climate according to Schmidt–Ferguson but as C2 by Oldeman. These results indicate that geographic location is not the only factor influencing rainfall distribution in South Sumatra. Rather, rainfall reflects the interaction of several factors, including topography, regional atmospheric circulation, monsoon patterns, proximity to water vapor sources, and interannual climate variability.

Oldeman's classification information can provide a climatological basis for developing planting calendars that are better suited to local conditions rather than applying a uniform schedule to every regency. This is because the lengths of the wet and dry seasons differ among regions. For example, C1 areas offer greater flexibility in determining the beginning and sequence of planting seasons than C2 areas. Meanwhile areas with a D2 climate type, planting should be scheduled during the wet period so that crop growth phase with high water requirements coincide with adequate water availability.


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In terms of irrigation requirements, there is a tendency for the need for supplementary water to increase as wet season become shorter and the dry periode become longer. In climate type C1, rainfall can serve as the main water source during most of the planting season, although irrigation is still needed as a water reserve when climate anomalies occur. In C2 areas, irrigation becomes increasingly important, especially towards the end of the second growing period or when the dry season begins. Meanwhile, in climate type D2 areas, irrigation networks, reservoirs, retention ponds, or other surface water sources are particularly necessary because rainfall is not always sufficient to meet crop needs throughout the growing season.

Climate type information can also support the selection agricultural commodities. Areas with longer wet periods are more suitable for crops with relatively high water requirements, whereas areas with slightly longer dry seasons should consider crops with lower water requirements or greater drought tolerance. However, climate classification results should not be used as the sole basis for determining commodity suitability. Other factors such as soil type, topography, irrigation systems, soil fertility, crop varieties, and cultivation techniques, must also be considered. Therefore, Oldeman's classification results in this study are more appropriately used as preliminary agroclimatic information to support agricultural planning.

This information can also support water resource management. For example, areas with type C1 have a greater potential to store excess rainfall during the wet season as a reserve for the dry season. In contrast, areas with types C2 and D2 require water management strategic because the dry period lasts longer. Thus, climate classification information can be used not only to determine cropping patterns but also to support water resource conservation and distribution planning. Overall, the results of the Oldeman classification indicate that differences in agroclimate types have direct implications for planting opportunities and water requirements.


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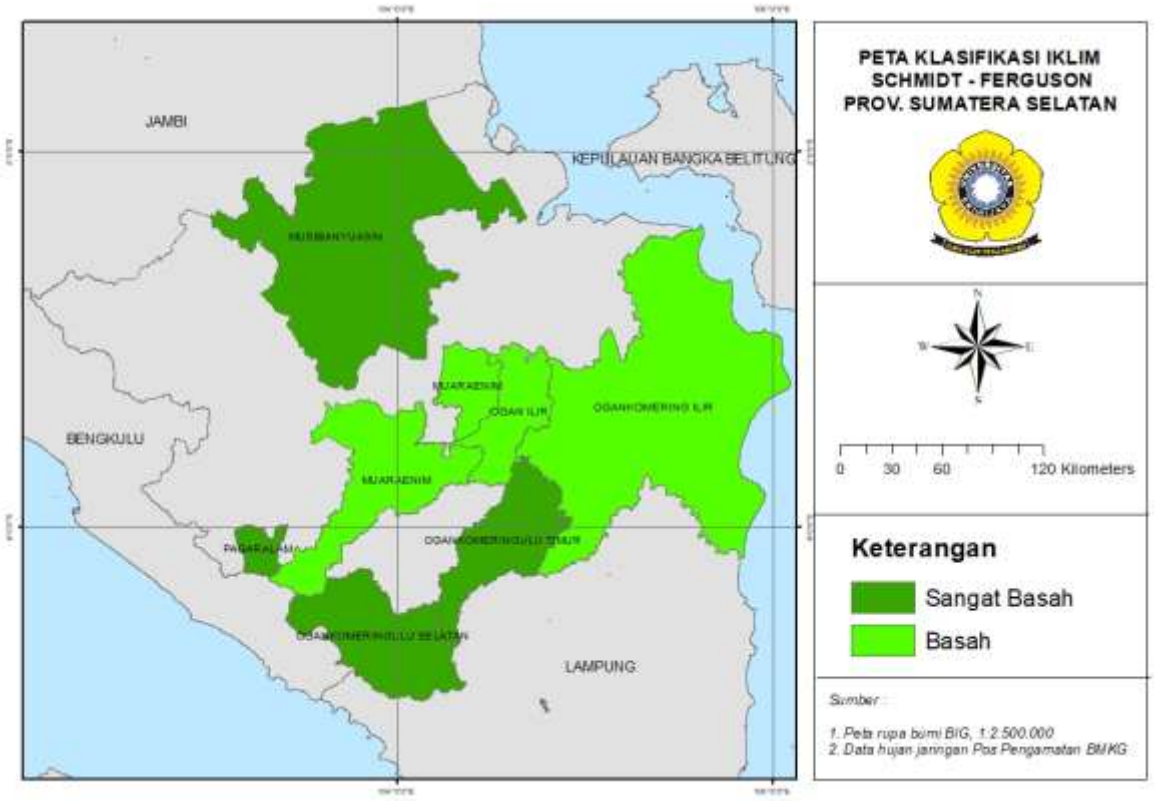



**Figure 4. Schmidt–Ferguson Climate Classification Map**


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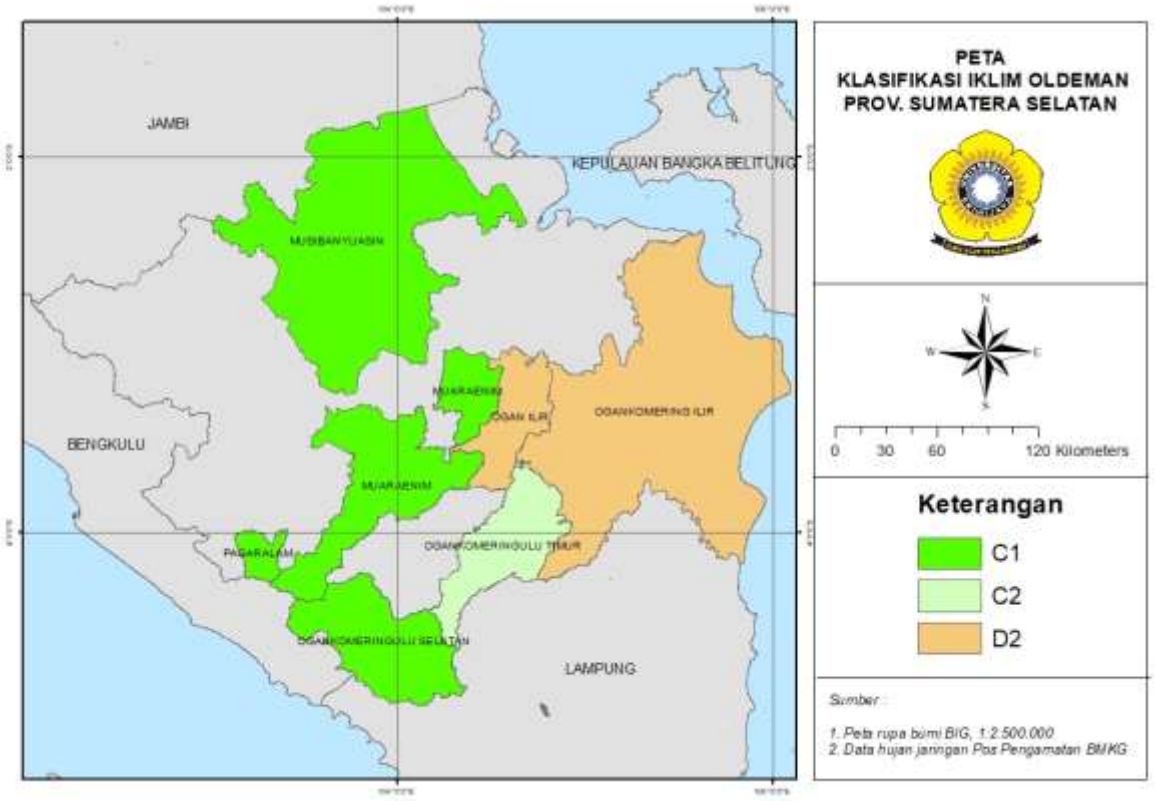



**Figure 5. Oldeman Climate Classification Map**

## CONCLUSION

Based on rainfall for 1995-2025 from seven regencies/cities in South Sumatra Province, the Schmidt-Ferguson classification identified Very Wet climate type in Musi Banyuasin Regency, East OKU Regency, South OKU Regency, and Pagar Alam City. Meanwhile, Ogan Ilir Regency, OKI Regency, and Muara Enim Regency are classified as Wet climate type. For the Oldeman climate classification, several areas in South Sumatra Province are dominated by the C1 climate type, namely Musi Banyuasin Regency, South OKU Regency, Muara Enim Regency, and Pagar Alam City. The C2 climate type is found in East OKU Regency, while the D2 climate type is found in Ogan Ilir Regency and OKI Regency.

Spatial distribution indicates that the western and central parts of South Sumatra Province tend to have wetter climatec conditions than the eastern parts. Areas around the Bukit Barisan


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Mountains range are generally classified as Very Wet climate type in the Schmidt–Ferguson classification and climate type C1 in the Oldeman classification, while the eastern lowland areas tend to be included in the Wet climate type and climate type D2.

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