

**PENGEMBANGAN MODEL CITRA MOSAIK TAHUNAN  
TILE BASED MOSAIC (TBM) LANDSAT-8 OLI DAN EVALUASINYA UNTUK  
KLASIFIKASI LIPUTAN LAHAN (STUDI KASUS SUMATERA BAGIAN TENGAH)**

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**INTISARI**

Sampai saat ini, belum tersedia model pembuatan citra mosaik tahunan yang efisien, operasional, dan terstandardisasi, meskipun ketersediaan citra satelit penginderaan jauh resolusi menengah per scene semakin banyak dan mudah diakses publik. Penelitian ini bertujuan membangun prosedur standar atau model pengolahan data citra mosaik tahunan penginderaan jauh resolusi menengah tutupan awan minimal, dengan pendekatan tile-based mosaic (TBM). Pendekatan TBM merupakan model pembuatan citra mosaik tahunan diolah berdasarkan kelompok piksel atau tile ukuran tertentu kualitas terbaik dengan tutupan awan dan gangguan kabut terendah. Model TBM merupakan pengembangan dari model PBM (pixel-based mosaic) yang diolah berdasarkan piksel terbaik dengan tutupan awan dan kabut minimal. Lebih spesifik, tujuan tersebut mencakup tiga hal yakni melakukan: (1) pengembangan permodelan citra mosaik tahunan berbasis tile dari berbasis piksel, (2) uji interpretabilitas visual dan digital hasil permodelan berbasis tile, untuk mengkaji optimalitas kualitas citra TBM, dan (3) uji konsistensi citra TBM yang dikembangkan melalui eksperimen pengolahan untuk klasifikasi liputan lahan secara time-series, guna melihat optimalitas dan efisiensi operasionalisasi model untuk pemantauan wilayah darat, secara digital. Metode penelitian yakni eksperimental dengan model TBM menggunakan data Landsat-8 OLI resolusi spasial 30 m untuk memilih ukuran tile terbaik sebesar 0,10o, 0,05o, dan 0,02o. Data yang digunakan sebanyak 478 scene akusisi selama 2,5 tahun dari Januari 2015 hingga Juni 2017, dengan tutupan awan rata-rata lebih dari 40%, dan secara spasial mencakup 10 scene. Hasil penelitian menunjukkan bahwa citra model TBM ukuran tile 0,02o memberikan kualitas citra dengan persentase luas clear area (pCA) paling tinggi yakni 86,4%, dibandingkan ukuran tile 0,05o (78,8%) dan 0,10o (68,2%). Citra TBM tile 0,02o menampakkan tingkat konsistensi antar tahun yang dapat diterima, dicerminkan dari interpretabilitas visual untuk 4 (empat) objek utama liputan lahan berkategori tinggi dan interpretabilitas digital dengan akurasi rata-rata (average overall accuracy - AOA) > 80%. Citra TBM untuk klasifikasi digital liputan lahan secara time-series menunjukkan bahwa kelompok kombinasi Band 6-5-4-3-2 secara konsisten menghasilkan tingkat ketelitian Baik dengan AOA 86% untuk enam kelas objek. Penggunaan kelompok kombinasi Band 6-5-4-3-2, Band 6-5-4, dan Band 6-5 menunjukkan konsistensi Baik untuk empat kelas objek, dengan masing-masing AOA 89%, 82%, dan 81%. Penggunaan citra TBM paling efisien untuk klasifikasi liputan lahan empat objek yakni kombinasi Band 6-5 dengan AOA 81%. Model pengolahan dapat menghasilkan konsistensi Baik dan efisien untuk analisis empat objek, dan direkomendasikan menjadi bagian proses standardisasi pengolahan citra satelit resolusi menengah.

**Kata Kunci:**

citra mosaik tahunan, tutupan awan minimal, *tile-based mosaic*, interpretabilitas visual, dan interpretabilitas digital

**MODEL DEVELOPMENT OF ANNUAL TILE BASED MOSAIC (TBM) IMAGES OF  
LANDSAT-8 OLI AND ITS EVALUATION FOR LAND COVER CLASSIFICATION  
(CASE STUDY CENTRAL PART OF SUMATRA)**

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**ABSTRACT**

*Until now, there is no efficient, operational and standardized model for making annual mosaic imagery, even though the availability of medium-resolution remote sensing satellite images per scene is increasing and is easily accessible to the public. The objective of this study is to build standard procedure or model of minimal cloud cover medium-resolution of remote sensing annual mosaic image processing using tile-based mosaic approach (TBM). The TBM approach is an annual mosaic image development model that is processed based on the best quality and the lowest pixel value of cloud cover from each tile or pixel group. The TBM model is an improvement of the PBM (pixel-based mosaic) model that is processed based on the minimum pixel value of cloud cover. More specifically, the objectives include three things: (1) to develop model (procedure) of the annual tile-based mosaic images from the pixel-based mosaic images for study area, (2) to examine the visual interpretability and digital interpretability of the tile-based model results to assess the image quality, and (3) to examine the developed tile based image consistency through digitally image processing experiments for time-series land cover classification, to see the operational efficiency of the model for land resources monitoring. This study was done by experimental method with the implementation of the TBM model using 30 m spatial resolution of Landsat-8 OLI images consist of, 478 scenes totally with average cloud cover > 40% from 10 scenes. The experimental method was carried out to select tile sizes of 0.10°, 0.05° and 0.02°. The results show that the smallest tile size TBM image by 0.02° providing the best result with the highest percentage of clear area (PCA). The PCA of the data acquired from January 2015 to June 2017 (2,5 years) for tile size 0.10°, 0.05°, and 0.02° were 68.2%, 78.8%, and 86.4% respectively. The annual TBM image model of 0.02° shows an acceptable consistency, reflected by visual interpretability of the images, and digital interpretability for time-series land cover analysis, with average overall accuracy (AOA)  $\geq 80\%$ . The use of image data with for the digital classification of time-series land cover shows that the group of band combination of 6-5-4-3-2 consistently resulted a Good accuracy with the AOA of 86% for the six classes. The groups of band combinations of 6-5-4-3-2, Bands 6-5-4, and Bands 6-5, show Good consistency for four classes of land cover, with the AOA of 89%, 82%, and 81% respectively. Accordingly, the most efficient annual mosaic image combination for the analysis of the four land cover is the combination of Band 6-5 with the AOA of 81%. The most efficient use of TBM imagery for the classification of four object land cover is the combination of Band 6-5 with 81% AOA. The processing model could produce Good accuracy, consistency, and efficiency for the analysis of four objects, and was recommended to be part of the standardization process of medium-scale satellite image processing.*

**Keywords:**

*annual mosaic image, minimum cloud cover, tile-based mosaic, visual interpretability, and digital interpretability.*