Pemetaan deformasi permukaan tanah dengan psinsar menggunakan citra palsar satelit Alos pada area Bandung dan sekitarnya = Land surface deformation mapping with psinsar with Alos palsar images in Bandung and surrounding areas / Antoni

Antoni, author

Abstrak

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Jika dilakukan observasi, bentuk permukaan bumi setiap saat selalu berubah-ubah atau mengalami deformasi. Hal ini dapat dipengaruhi oleh faktor alam, manusia ataupun gabungan dari keduanya. Beberapa perubahan bentuk ini dapat menyebabkan bencana kalau tidak kerugian. Sehingga perlu adanya suatu metode untuk melakukan pengukuran dan pemetaan deformasi permukaan tanah.
Pada penulisan ini dilakukan study-case pemetaan deformasi yang terjadi pada area Bandung dan sekitarnya. Fokus dari percobaan adalah mengamati laju deformasi pertahun pada area tersebut. Teknik PSInSAR dengan kerangka kerja StaMPS digunakan untuk mengolah data citra PALSAR satelit ALOS menjadi peta laju deformasi.
Pemetaan dengan citra radar dipilih karena kemampuan akuisisi citranya yang dapat digunakan pada hampir semua kondisi. Sinyal sensor SAR dapat menembus awan sehingga dapat mengatasi kesulitan dalam menganalisis kawasan yang diselimuti awan, seperti Bandung. Sensor ini juga dapat bekerja siang-malam, karena sensor bekerja secara aktif dalam memancarkan dan menangkap sinyalnya. Ketelitian hingga ukuran mm per tahun dapat diperoleh dengan menggunakan teknik SAR persistent scatterrer interferometry. Selain itu dengan melakukan analisis ampitudo dan fase pada beberapa interferogram menggunakan kerangka kerja StaMPS, pengukuran juga dapat dilakukan walaupun pada area yang berkoherensi rendah. Misalnya sebagian besar area terselimuti oleh vegetasi ataupun keadaan atmosfir yang menyelimuti, seperti kawasan Bandung dan sekitarnya.
Dari hasil pemetaan dapat diamati bahwa terjadi penurunan permukaan tanah pada hampir seluruh kawasan perkotaan Bandung. Penyusutan dengan nilai tertinggi terjadi pada daerah Cimahi dan Bojong sebesar 13.5 cm per tahun. Diduga penurunan muka tanah pada area perkotaan Bandung diakibatkan oleh pemakaian air tanah yang berlebih terutama pada kawasan industri.
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ABSTRACT
If the observation is made, it is observable that earth surface is always changing or constantly undergo a deformation. This can be caused by natural factors, human, or a combination of both. Some of these deformation can lead to disaster if not

losses. Because of that, it important to have method to measure and ultimately map the ground surface deformation.
In this study-case, the map of deformation that occurs in Bandung and it surrounding areas was made. The focus of the experiment was to observe the deformation rate per year in these areas. PSInSAR technique with StaMPS framework was used to processed PALSAR images of ALOS satellite.
Mapping with radar images was chosen because of radar imaging system have the capabilities to operate at almost any condition. SAR sensor signal can penetrate clouds this can be used to overcome the difficulties in analyzing the cloudy areas, such as Bandung. This sensor can also work day and night, because it is active sensor, it emit and recieve it's own signal.
Using the SAR persistent scatterrer interferometry technique, measurement accuracy up to mm per year can be obtained. In addition, by analyzing amplitude and phase of multiple interferograms using StaMPS framework, the measurement even with low coherence image can be done. For example, most of the area-ofinterest is covered by vegetation or randomly high atmosphere retardation at surrounds area, such as Bandung and it?s surrounding areas.
Form the deformation map, can be observed that there was a subsidence in almost all urban areas in Bandung. The highest value of ground shrinkage occurred in Cimahi and Bojong with 13.5 cm per year. Suspected, land subsidence of urban areas in Bandung was caused by excessive use of ground water, especially in the industrial area.;If the observation is made, it is observable that earth surface is always changing or constantly undergo a deformation. This can be caused by natural factors, human, or a combination of both. Some of these deformation can lead to disaster if not losses. Because of that, it important to have method to measure and ultimately map the ground surface deformation.
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