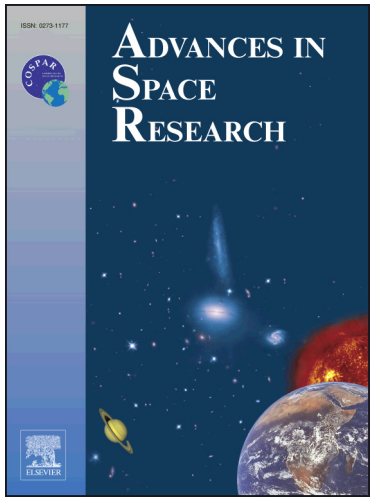


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# First Prospects in a New Approach for Structure Monitoring from GPS Multipath Effect and Wavelet Spectrum

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**Abstract**

Continuous monitoring of large structures is essential to ensure their integrity. Many instruments and methods have been developed to support structure monitoring. Global Positioning System (GPS) plays an important role in such task thanks to the precision and millimeter level accuracy of the provided position information in near real-time. However, installing a GPS receiver can be a really difficult task depending on the structure, mainly when it is under collapse danger. To address this issue, this paper presents a new methodology for structure monitoring, without installing a receiver directly on the structure. Instead, a time-frequency analysis of the multipath effect, caused by GPS signal reflections, is performed. As this effect repeats in consecutive days, a change on its pattern indicates structure movement. This work investigates the feasibility of using wavelet spectra analysis of the multipath signal to monitor structure movement. An experiment simulating a structure movement was carried out and real GPS data were collected. Pseudorange and carrier phase data were evaluated using different wavelet bases. The experimental results have shown that the proposed methodology has great potential for detection of structure movements, especially using

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