



## Satellite imagery time series for the detection of looting activities at archaeological sites

Rosa Coluzzi (1), Rosa Lasaponara (1), and Nicola Masini (2)

(1) CNR- IMAA, C/da S. Loia Zona industriale, 85050, Tito scalo (PZ), Italy, coluzzi@imaa.cnr.it, lasaponara@imaa.cnr.it, (2) CNR-IBAM, C/da S. Loia Zona industriale, 85050, Tito Scalo (PZ), Italy, n.masini@ibam.cnr.it

Clandestine excavations is one of the biggest man-made risks which affect the archaeological heritage, especially in some countries of Southern America, Asia and Middle East.

To contrast and limit this phenomenon a systematic monitoring is required.

The protection of archaeological heritage from clandestine excavations is generally based on a direct surveillance, but it is time consuming and expensive for remote archaeological sites and non practicable in several countries due to military or political restrictions.

In such conditions, Very high resolution (VHR) satellite imagery offer a suitable chance thanks to their global coverage and frequent revisit times.

This paper is focused on the results we obtained from ongoing research focused on the use of VHR satellite images for the identification and monitoring of looting.

A time series of satellite images (QuickBird-2 and World-View-1) has been exploited to analyze and monitor archaeological looting in the Nasca Ceremonial Centre of Cahuachi (Peru) dating back between the 4th centurt B.C. and the 4th century A.D.

The Cahuachi study case herein presented put in evidence the limits of VHR satellite imagery in detecting features linked to looting activity. This suggested to experience local spatial autocorrelation statistics which allowed us to improve the reliability of satellite in mapping looted area.