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Archaeogeophysics in Peru and in Bolivia: the contribution of Italian CNR with ITACA mission (2007-10).

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ITACA (Italian mission of heritage Conservation and Archaeogeophysics) is an international scientific mission recognized and funded by the Italian Ministry of Foreign Affairs. It is composed of researchers of IBAM (Institute of Archaeological and Architectural Heritage) and IMAA (Institute of Environmental Analysis).
ITACA began up its activities since 2007, with the aim of supporting archaeological investigations of CISRAP (Italian Center for the Study and Research of Pre-Columbian Archeology) directed by Giuseppe Orefici, in the Ceremonial Centre of Cahuachi and in the drainage basin of Rio Nasca (Southern Peru) by means of archaeogeophysical methods.
Cahuachi was an important ceremonial centre which served as a place of pilgrimage for the population living in the basin of Rio Grande (4th BC-4th AD). The archaeological evidences spread out on a large desolate area sited on the left of the Nasca river, characterized by around 40 mounds which protect monumental pyramids, platforms and squares, built with adobe.
From 2007 to 2010, five campaigns of investigation have been carried out. The main activity was focused on the integration of aerial and satellite remote sensing data with geophysical (georadar, magnetic and geoelectrical techniques) prospection. The multi-scale and multi-sensor approach allowed us: (i) to discover buried walls, tombs and ceremonial offerings in Cahuachi, dating back to the 2nd-4th century A.D. [1,2, 3, 4], and (ii) to detect a large buried settlement close to the Nasca riverbed at 1.8 km Northwesterwards from the Ceremonial Centre [5].
Other investigations focused on the analysis of palaeoenvironment as well as on the survey and monitoring of clandestine excavations by means of robust satellite data statistical processing [6].
Beginning from august 2010, ITACA mission has been starting the survey, detection and study of geogliphs near Cahuachi, with the aim of understanding their spatial and functional relation with the monumental pyramids of the close Ceremonial Center.
On 2009 the scientific mission carried out a geophysical investigation campaign in Tiahuanaco (Bolivia), where the integration of geomagnetic prospections and satellite data allowed us to identify some anomalies of archaeological interest located between Kantatallita, Akapana and Templete.
In 2010, it was signed a scientific agreement between CNR mission and Museum of Sipan directed by Walter Alva with aim of supporting archaeological excavations and the strategies of conservations of unearthed structures in the Lambayeque region (Northern Peru), by means of remote sensing methods (geophysics and satellite remote sensing) and non invasive diagnostics tests. So, on dicember 2010 ITACA mission has performed the first archaeogeophysical investigation near the Huaca of Ventarron, a religious sanctuary dating back to around 2000 B.C. In particular, Georadar prospections performed in Arenal, near Ventarro, detected several features of archaeological interest, thus allowing the archaeologists directed by Ignacho Alva, to plan in the future a more oriented excavation campaign.
This papers refers the activity carried out by ITACA mission in Northern and Southern Peru and Bolivia from 2007 to 2010, focusing on the used methodological approach (and related results obtained) in presence of a variety of : i) archaeological features (from monumental pyramids to geogliphs); ii) archaeological buried remains (from earthen structures of Cahuachi and Arena to stone walls of Tiwanaku), iii) soils covering the archaeological deposits (from sands of Arenal to slimy and weakly clayey sands of Cahuachi); iii) and investigation aims (from site discovery to the monitoring of archaeological looting)

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