

## Searching asbestos roofs using satellite imagery

**Giuliana Bilotta**

IUAV University of Venice, Italy

A long exposure to asbestos is connected to the emergence of harmful diseases that affect the respiratory system. In particular, the friable asbestos is the most dangerous element, because its fibres easily disperse and have a particular aptitude to penetrate into the respiratory system. Despite the risks mentioned above, the number of roofs of buildings containing asbestos is still high in many countries. In Italy there are still many buildings characterized by roofs of a mixture of cement and asbestos, once common for the features of the material, as characteristics of mechanical resistance and its low cost.

An environmental monitoring for detecting the presence of this material in urban areas is generally made by means of expensive dedicated air travels, since typically the airborne payload is a hyperspectral sensor.

Unlike the air missions, satellites continuously orbit around the Earth. In particular, some commercial optical satellites in sun-synchronous orbit that monitor at very high geometric resolution are particularly suitable for this type of search.

This paper proposes the use of optical satellite data that, through the analysis object-based, have proved to be effective for detecting asbestos roofs.

Legislation requires intervention for the replacement of these roofs, and among the possible replacements is the smart substitution of asbestos roofs with PV roofs for producing energy.

What is proposed could so become a common and much less expensive practice than the current, which involves the use of airborne sensors.

The object based techniques for classifying satellite data allow to identifying buildings with roofs made by materials containing asbestos. In particular, in this paper from the start satellite imagery is integrated with cadastral data in vector format (shapefile) to maintain through the various procedures of segmentation and classification, the cadastral information relating to property. The object-based method consists in a Nearest Neighbor classification tool following a multi-resolution segmentation of the whole scene.