

No chance for doubts: a multidisciplinary approach for solving a criminal case

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INTRODUCTION

The recovery of severely altered cadavers (i.e., extensively decomposed, mummified, charred or dismembered) can be a challenge for forensic pathologists due to the difficulties in identification, PMI estimation and manner and cause of death determination. In such cases, integrating routine approaches (autopsy, histology, toxicology) to more specific forensic branches can be fundamental to improving the investigative process. For this reason, the collaboration of specialized branches, such as **forensic entomology, botany, veterinary and geology** - get involved by forensic medicine in certain circumstances and difficult cases - can add to the story many small elements and information that are ultimately useful in supporting the hypotheses of the realization of the event, like small pieces that make up a puzzle, closing doubts to other hypotheses.



CASE REPORT

In August 2020 in an agricultural fund consisting of scattered and uncultivated vegetation typical of the Mediterranean maquis: *Erica arborea*, *Calicotome spinosa*, *Arbutus unedo*, *Myrtus communis*, *Pistacia lentiscus*, *Quercus ilex* and *Quercus suber*, at the foot of a metal pylon for the suspension of high/medium voltage electrical cables, the corpse of a female subject was found. The corpse was in a prone position, largely exposed to the sun, and only partially concealed by the vegetation present. She was wearing light clothing and showed obvious putrefactive decomposition with partial skeletonization of some body districts, particularly maxillo-facial with extensive exposure of the dental articulation. The body surface was covered with numerous dipteran larvae, which also extended to the surrounding soil that was soaked in putrefactive sewage

The corpse was recovered and, at the same time, entomological elements were retrieved and activities were continued according to the protocol summarized in **figure 1**. The circumstantial data reported by the operating J.P. suggested that it might be the corpse that had belonged in life to a young woman who had disappeared a few days earlier. Autopsy was performed and other investigations started.

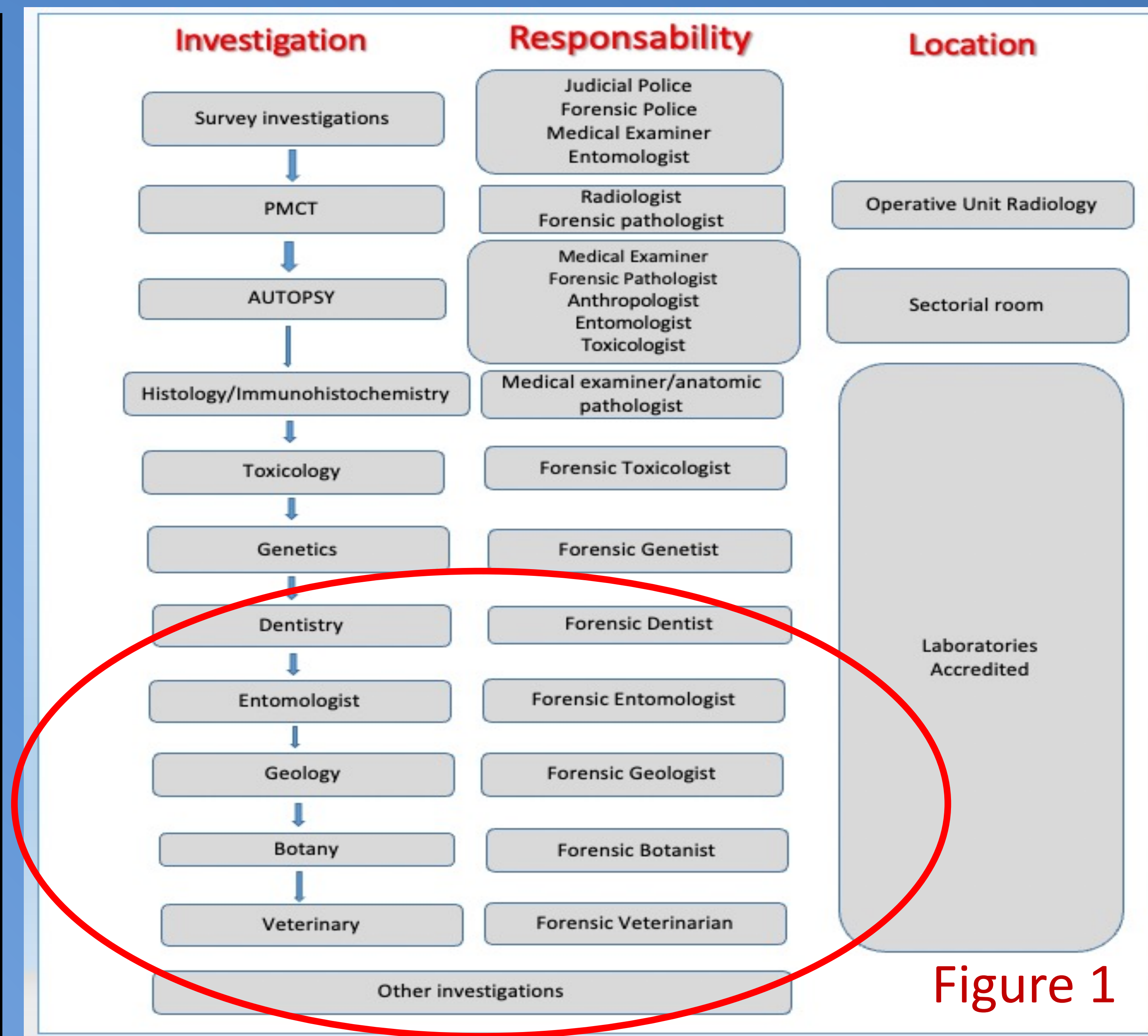
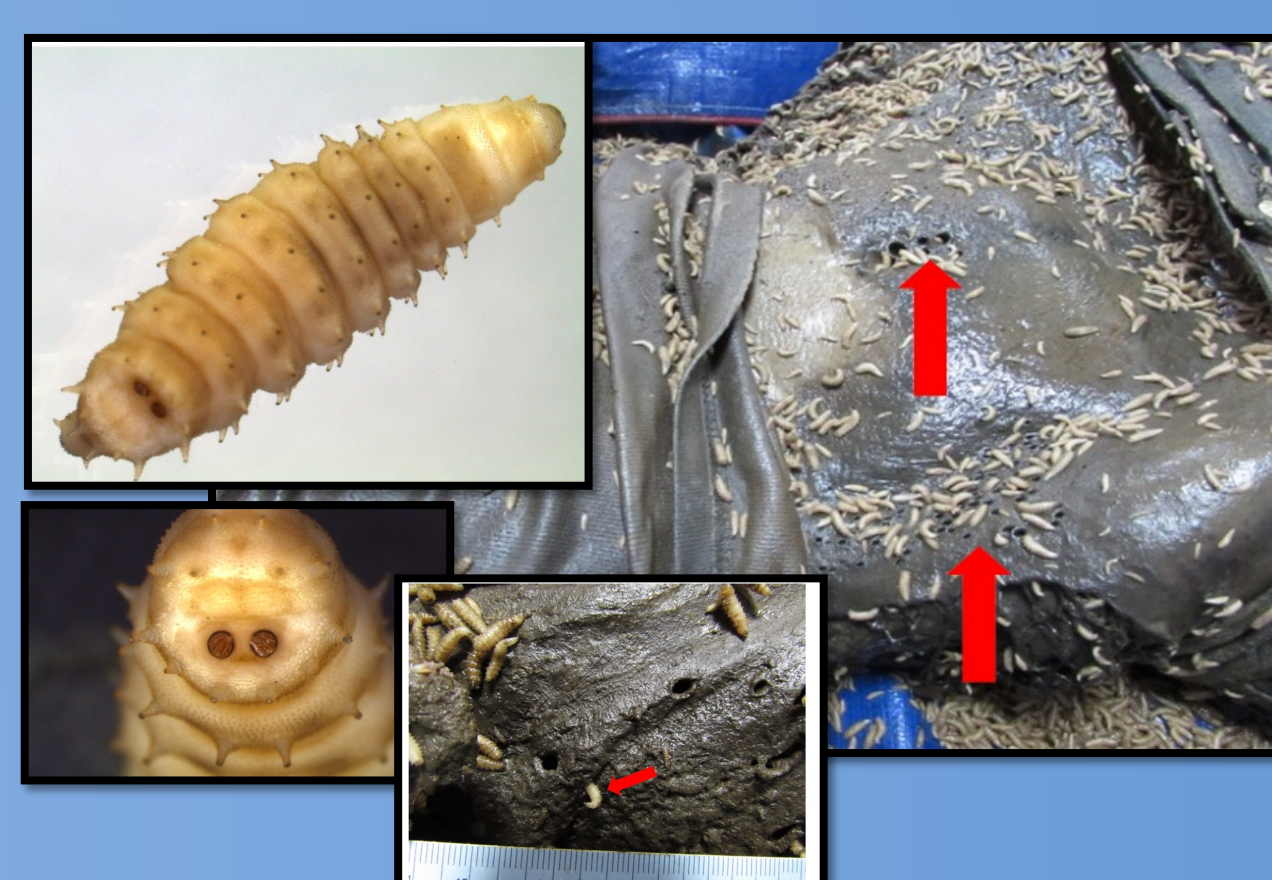


Figure 1

RESULTS

The multidisciplinary approach - through other activities including engineering physics and also psychological autopsy - allowed a reconstruction of the dynamics of the event as a **consequence of voluntary/suicidal precipitation from the high voltage pylon present a short distance from the point where the corpse was found**. In fact, signs attributable to the violent action by a third party and other type of traumatic event at the basis of any other dynamics including typical signs, characteristic and/or indicative, of electrocution (electric brand) were excluded; the analysis of soils and particles present on the corpse allowed to exclude the displacement of the body, and report as the area of impact the area of discovery; forensic veterinarians have ruled out interventions of local fauna, albeit with the limitations dictated by the vitality of the injuries, difficult to express. 3D reconstructions allowed remote consultations and reconstruction of the scene, including by scanning it. The vegetation present was analyzed, regarding its growth around the corpse, adding useful details to the findings on the exact time of death.



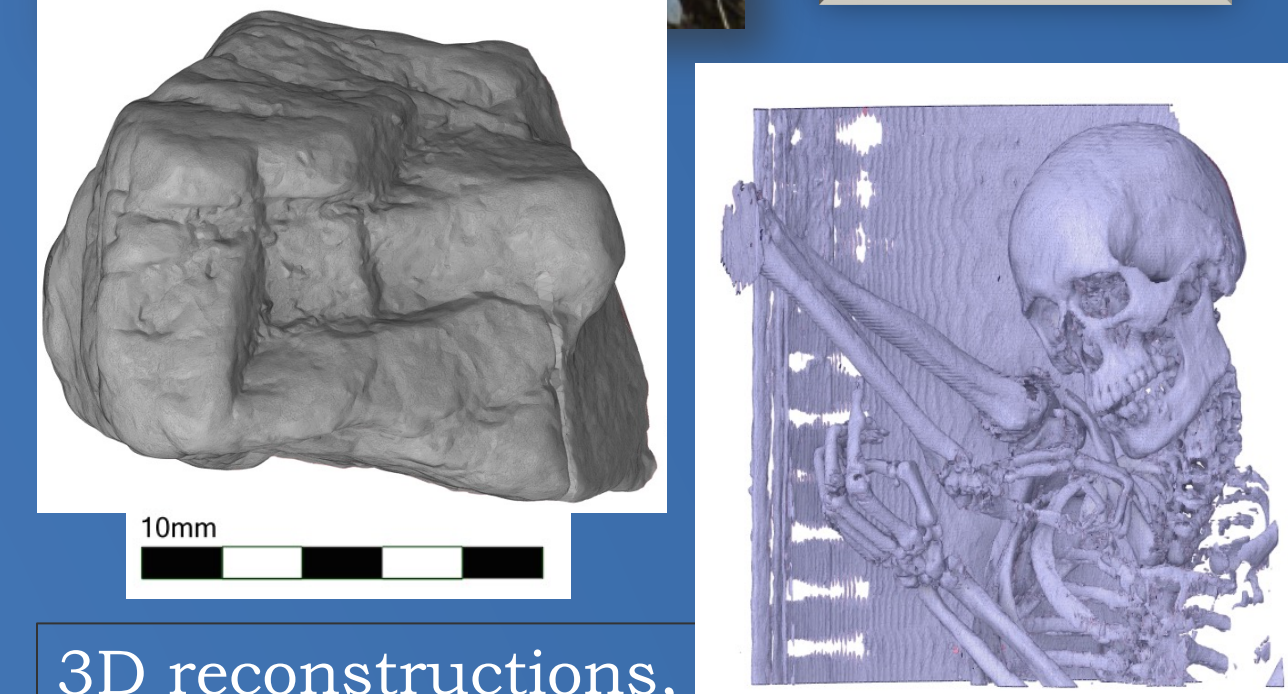
Odontoiatric and entomological analysis were performed important for identification and for the time of death

DISCUSSION

The case under study underscores the importance, for the resolution of court cases, of **standardized protocols involving cooperation with other disciplines**. Thanks to the multidisciplinary approach it was possible to provide an answer in terms of the time, cause and means of death.

Standard investigations were used, supplemented also by those recently considered within forensic investigations, which are gaining more and more popularity because they offer small details but very useful in the overview for solving complex case.

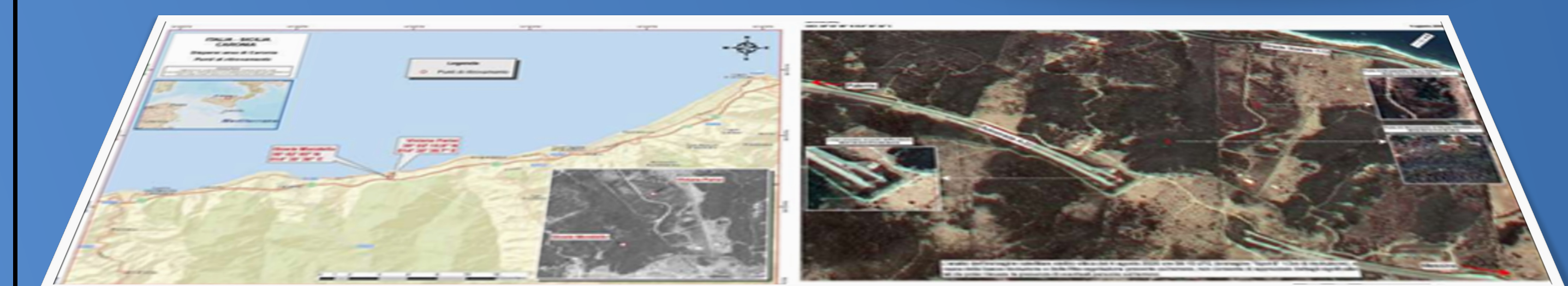
Forensic veterinary examinations



3D reconstructions, virtual rendering fit-matching comparison between lesions and soil/stone



Use of topographic maps, soil analysis, scanning of locations geology investigations



CONCLUSION

All the instruments and methods of approach described, therefore, aim at the realization of tools for the acquisition of **objective elements** to be made available for the trial assessment from which the same could draw great benefits.

The existence of limitations would have to be slowly overcome through **the application of a Bayesian multiparametric and multidisciplinary approach**.

The puzzle was completed and no chance for doubts!!

