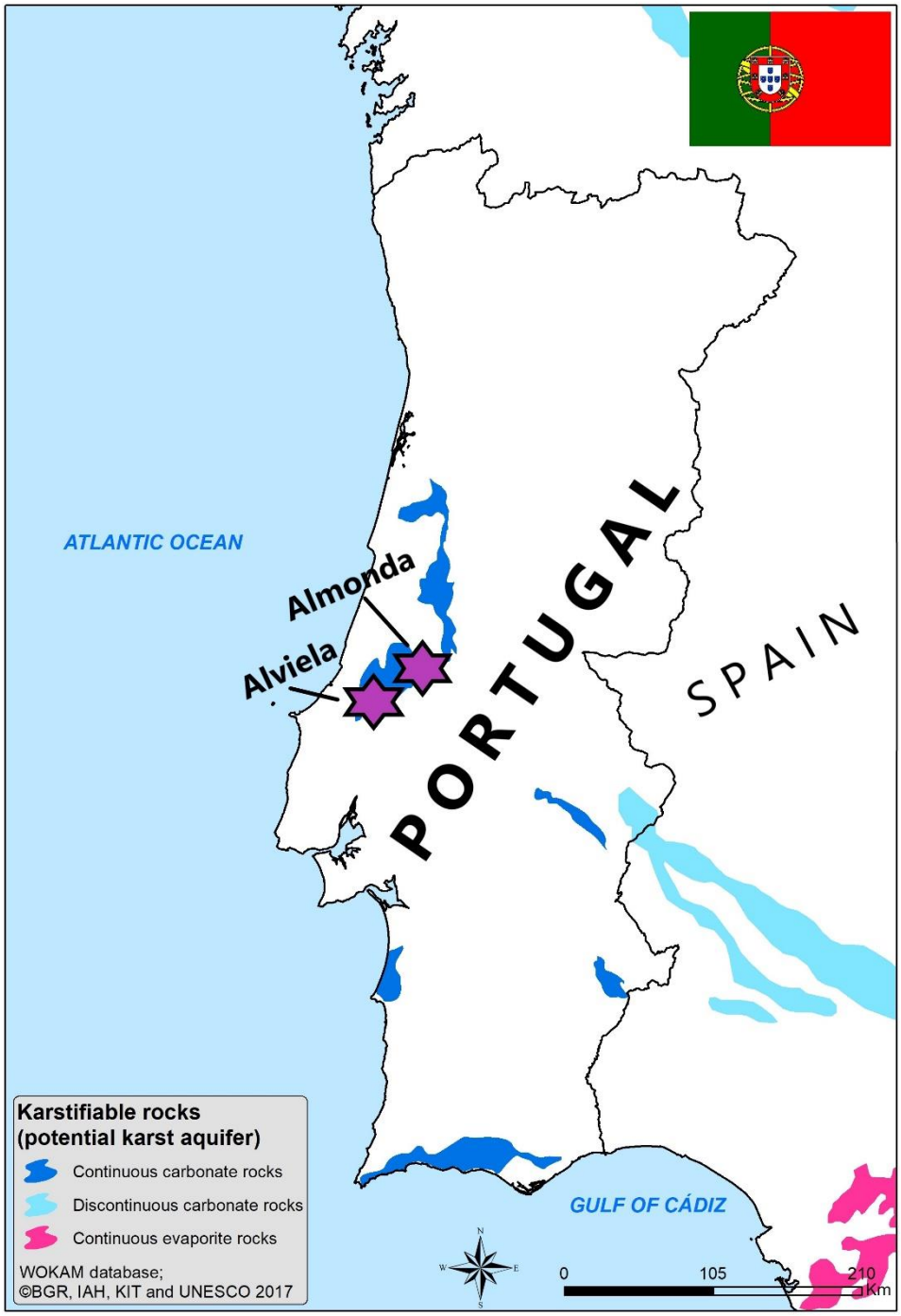
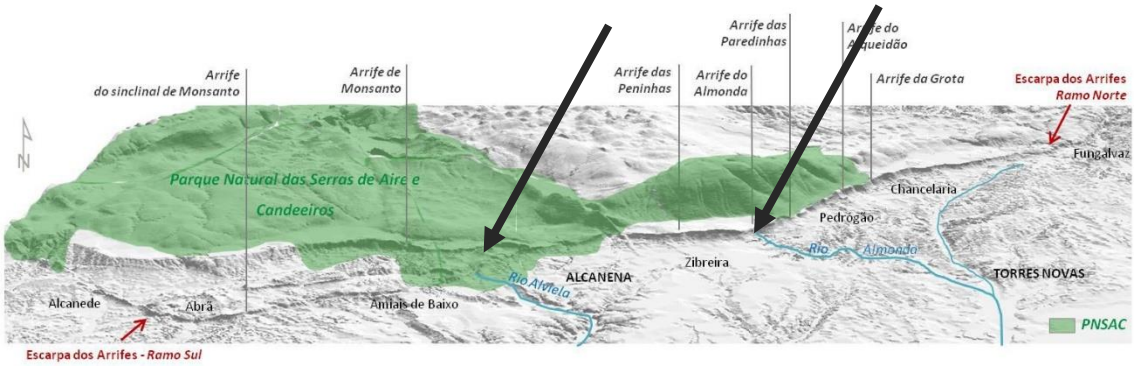
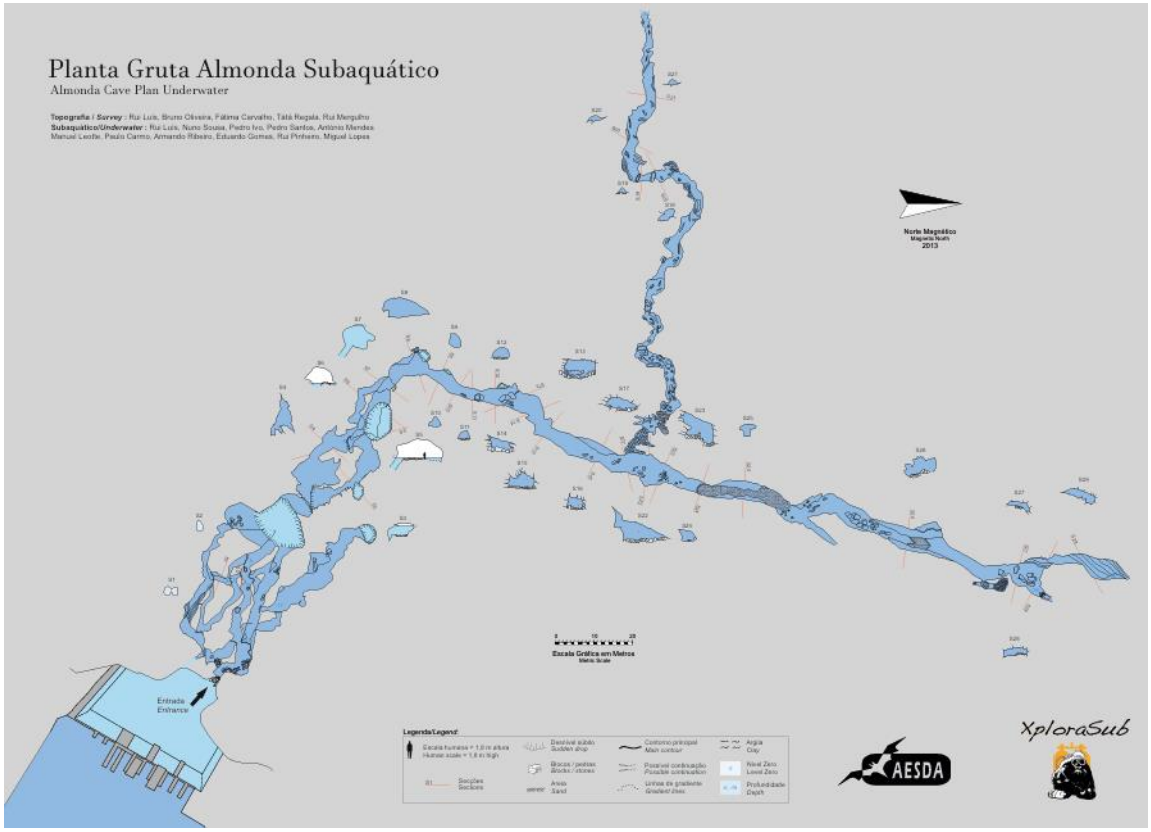

ATLANTIC OCEAN
Almonda
Alviela
PORTUGAL
SPAIN
GULF OF CÁDIZ
Karstifiable rocks
(potential karst aquifer)
Continuous carbonate rocks
Discontinuous carbonate rocks
Continuous evaporite rocks
WOKAM database;
©BGR, IAH, KIT and UNESCO 2017
N
W
E
S
0
105
210
km

| Country | MIKAS springs | Coordinates / Nearby City | Spring discharge (Q in l/s,min/av/max) / tapped or not | Criteria* in order / Main justification */ H-historic, A-aesthetic, S-scientific, E-Economic, Ec-ecologic | Data collected by |
|---|---|---|---|---|---|
| **Portugal**  | 1. **Almonda** | N3 9°30'17.31" W 8°36'54.68"<br><br>Z = 108 m asl<br><br>Torres Navas, Estremadura | - / 3150 / -<br><br>Not-tapped, used for local industry | ***H, S, Ec, E***<br>*The Almonda Spring as contact spring, is located on the southeastern margin of the Serra de Aire anticline. The karst aquifer is formed within Estremadura Limestone Massif of Jurassic age. The spring is a resurgence of Portugal's largest karst system – 17 km long and deepest with 285 meters (29 deepest in the world). The cave complex associated with the Almonda spring is highly important archaeologically. The Aroeira Cave, part of the karst system is one of the most important Palaeolithic archaeological sites in Portugal. Its deposits date back to the Middle Pleistocene, about 400,000 years ago, and preserve exceptionally important traces for understanding the first human populations in Western Europe. The spring/cave is protected since 1993. This is Ramsar site n.º 1616 which includes Mira-Minde Polje and associated springs (Alviela, Almonda, and Olho da Maria Paula).* | Rui Luis |
| | 2. **Alviela** | N 39°26'43.88" W 8°42'43.68"<br><br>Z = 76 m asl<br><br>Alcanena, Estremadura | 350 / - / 17000<br><br>Tapped and used for decades to supply city of Lisbon, nowadays not functioning as a water source | ***S, E, Ec, H***<br>*It is the largest Portuguese karst spring, located in the Natural Park of the Serras de Aire and Candeeiros. It was utilised since 1880 to supply the city of Lisbon through the Alviela Aqueduct, a gravity engineering work 114 km long. The intake is done close to the source, ensuring naturally filtered water. For several decades was one of the main sources of public water supply for Lisbon. Its importance decreased substantially from the 1950s when Castelo do Bode system came into operation. Nowadays, the Alviela Aqueduct remains part of the water conveyance and transport system. The Alviela spring has an underwater development of 2159 meters and a 215 meters depth. The absolute difference is 222 meters (ranking as 22nd in the world). It is under the Natura 2000 network, as a part of the Serras de Aire e Candeeiros Site – PTCON0015. It is also Ramsar n.º 1616 site (Mira-Minde Polje and associated springs Alviela, Almonda, and Olho da Maria Paula).* | Rui Luis |

## MIKAS – Almonda




*Almonda and Alviela Locations - 3D model of Escarpa dos Arrifes and its integration in the Natural Park of Serras de Aire e Candeeiros (PNSAC) (Leal, C. 2014).*




*Sketch map of surveyed cave channels (courtesy of Rui Luis)*





*Almonda spring in high and low water period (photos by Rui Luis)*

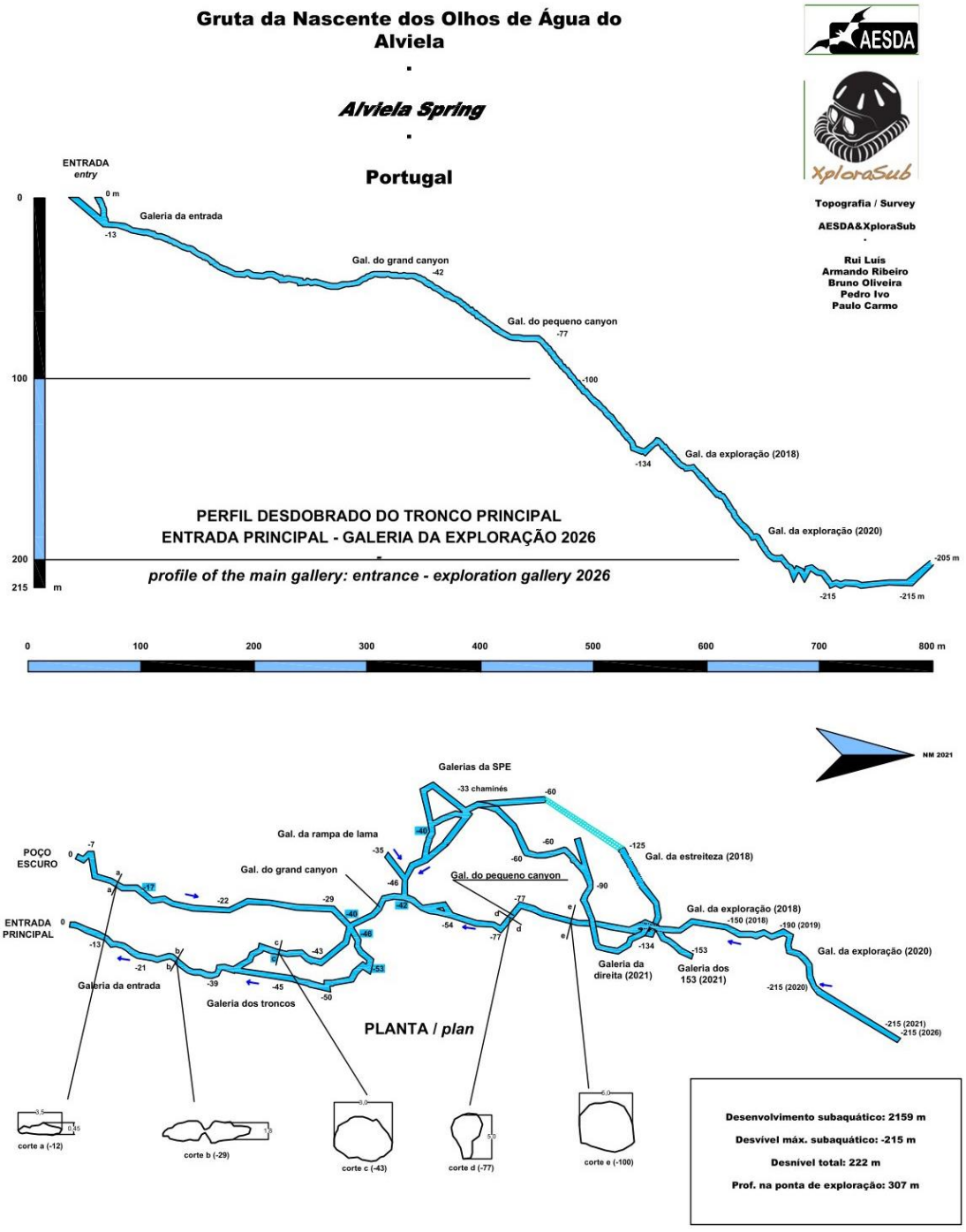






*Underwater cave diving (photos by Rui Luis)*

## MIKAS – Alviela




*Profile and sketch map of underwater channels of Alviela (courtesy of Rui Luis)*



*Alviela spring (photo by Rui Luis)*







*Alviela underwater channels (photos by Rui Luis)*