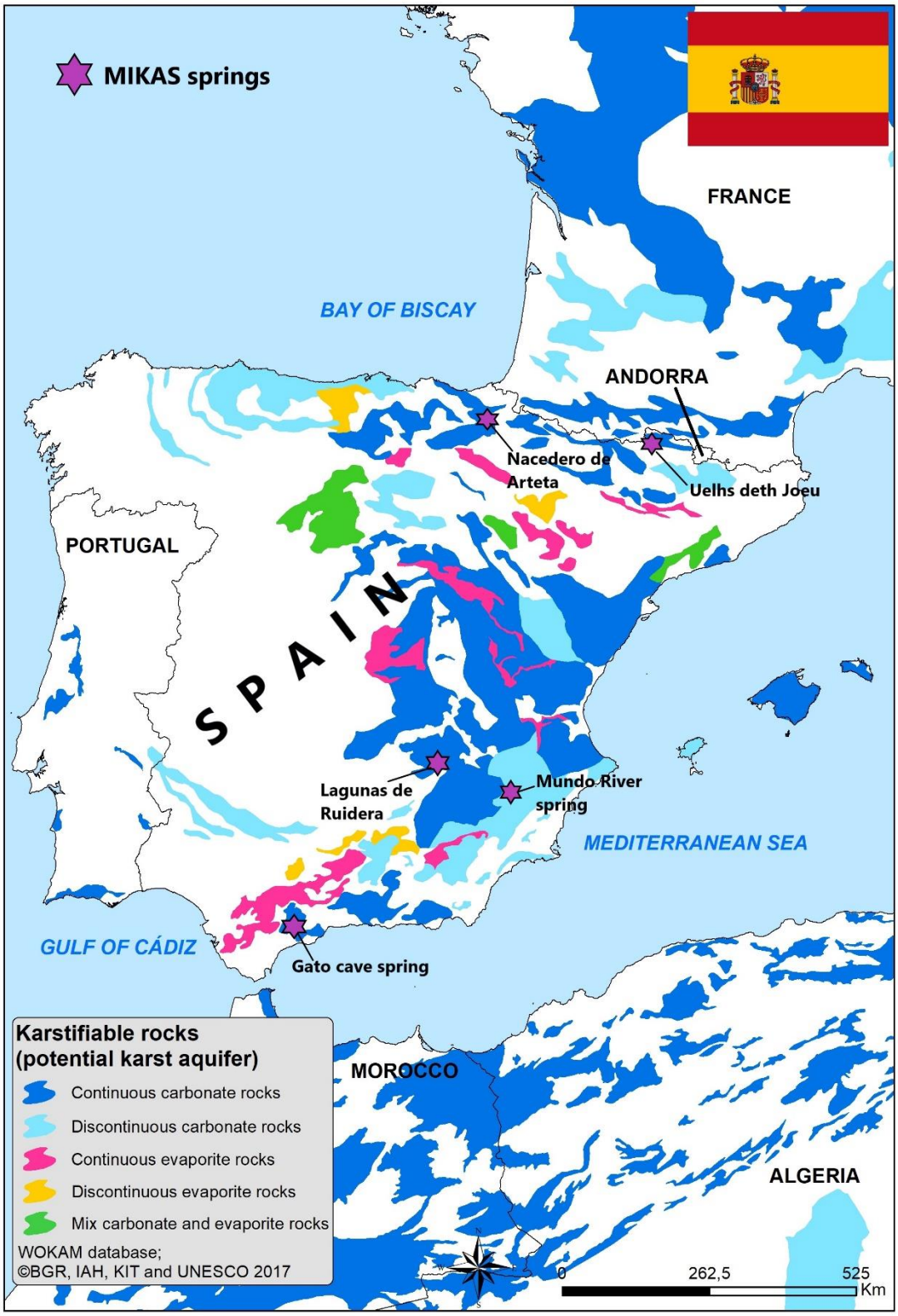

MIKAS springs
FRANCE
BAY OF BISCAY
ANDORRA
Nacedero de Arteta
Uelhs deth Joeu
PORTUGAL
SPAIN
Lagunas de Ruidera
Mundo River spring
MEDITERRANEAN SEA
GULF OF CÁDIZ
Gato cave spring
MOROCCO
ALGERIA
Karstifiable rocks (potential karst aquifer)
Continuous carbonate rocks
Discontinuous carbonate rocks
Continuous evaporite rocks
Discontinuous evaporite rocks
Mix carbonate and evaporite rocks
WOKAM database;
©BGR, IAH, KIT and UNESCO 2017
0
262,5
525
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
Spain 	1. **Gato Cave spring**	N 36º 43' 39" W 5º 14' 19" Z = 445 m asl Benaoján (Málaga)	16/1,500/17,800 Tapped, Part of water used for irrigation	***Ec, S, A, H, E*** *Gato Cave spring is one of the outlets of a speleological complex known as the Hundidero-Gato system, located in the Sierra de Líbar. There is evidence that the cave was inhabited since prehistoric times: the excavations carried out near this entrance determined the presence of vestiges of different prehistoric phases. In the 18th century, the cave from which the spring emerges was a refuge for bandits who travelled through the Serranía de Ronda. The cave is composed of 70m high rooms, fossil galleries, speleothems, canyons, shafts that are being extensively investigated. Gato Cave spring is located in a beautiful and attractive natural setting, surrounded by spectacular karst landscapes and permanently draining crystalline waters. The outflow of water from the spring into the Guadiaro river generates a beautiful waterfall. This set is listed as a Natural Monument and is located within the Natural Park of the Sierra de Grazalema.*	Beatriz de la Torre Martínez
	2. **Lagunas de Ruidera**	From (SE): N 38º54'42" W 2º48'55" to (NW): N 38º58'20" W 2º53'15" Z = 790-860 m asl Ruidera (Ciudad Real) and Ossa de Montiel (Albacete)	<1,000/1,800/13,000 Not-tapped	***Ec, A, S, E, H*** *15 lakes and wetlands limited by tufa barriers are developed along the Guadiana River, one of the largest rivers in Spain. The lakes are fed by at least 24 mostly permanent, gravity, fresh, submerged outlets. The Ruidera Lakes are recognized as a biodiversity hotspot, harboring a diverse range of plant and animal species. The various ecosystems within the lakes support a rich array of life, contributing to the overall biodiversity of the region. Particularly, the lakes serve as crucial habitats for numerous bird species, both migratory and resident, as well as fish and amphibian. In fact, the IUCN recognizes the Ruidera lakes as Freshwater Key Biodiversity Area. The lakes are also designated as a Natural Park, Special Protection Area under the European Union's Birds Directive (SPA), Site of Community Importance, a designation under the EU's Habitats Directive (SCI), Ramsar Site and UNESCO's Biosphere Reserve "Mancha Húmeda". A legend of the magical origin of Ruidera lakes is told in many books of the 17th century, but it is particular relevant its appearance in the Cervantes' adventures of Don Quixote de la Mancha.*	José Manuel Gil Márquez

	3. **Nacedero de Arteta**	N 42°50'38.94" W 1°52'12.78" Z = 545 m asl Ultzurrun/ Pamplona	250/3,000/21,000 Tapped. Dam and diversion channels. Activation of pumping wells in Summer.	***A, E, H, Ec*** *Part of the water from Arteta Spring is used to supply the Pamplona´s region (550 l/s of concession), and also for irrigation and to produce hydroelectric power (3,700 l/s of concession). Groundwater drained by Arteta spring has been a particularly relevant element in Pamplona's water supply system since the end of the 19th century. The combination of lush vegetation, rocks, and water creates a picturesque landscape. The presence of waterfalls and cascades upstream of the main outflow point enhances their aesthetic value. Water drained by the Arteta Spring supports a diverse range of plant and animal species downstream, in the Udarbe River. It is protected by the regional government as Natural Park (Parque Natural de las Sierras de Urbasa y Andía). The spring is included in a list of Groundwater Natural Reserves, defined by the Spanish Government.*	Matías Mudarra Martínez
	4. **Uelhs deth Joèu**	N 42^0 40'53.68'' E 0^0 42'28.60'' Z = 1395 m asl Vielha (Lleida, Cataluña)	0,135/1,580/9,641 Not tapped	***A, S, Ec*** *Vauclusian type spring issuing from Devonian limestones in transboundary alpine aquifer system (Pyrenees Mts.). It is the typical glacial-dominated high mountainous environment and its snowmelt - dependent hydrodynamic regime. A beautiful waterfall downstream of the spring orifice after floods in summer seasons confers it special aesthetic values. This karst spring sustains downstream alpine ecosystems, maintaining the baseflow of Joèu river in one of the most valuable and protected natural environments of NE Spain, which is the part of Aigüestortes and Estany de Sant Maurici National Park.*	Juan Antonio Barberá Fornell
	5. **Mundo River spring**	N 38º27'25" W 2º26'19" Z = 1054 m asl Riópar (Albacete)	50/ ? / 86,000	***S, A, Ec*** *Beautiful 80 m high waterfall in a huge (200 m) limestone cliff with a large cave system (>24 km) behind the spring. Specific discharge mechanism based on "revolver-type" flow because of the combined action of heavy rainfall and posterior snow melting recharge. Impressive karst landform development, both endokarst and exokarst. The Mundo River comprises one of the main tributaries in the Segura River basin (draining almost 19,000 km^2 at SE Spain). It sustains the ecological flow of Mundo River, keeping the riverine ecosystems downstream. Spring with many karst features in the area (>960 dolines inventored, 70 dolines/km^2, 85 cavities explored), belongs to Calar del Mundo Natural Park. Also designated as Place of Geological Interest.*	Juan Antonio Barberá Fornell

MIKAS - Gato Cave spring

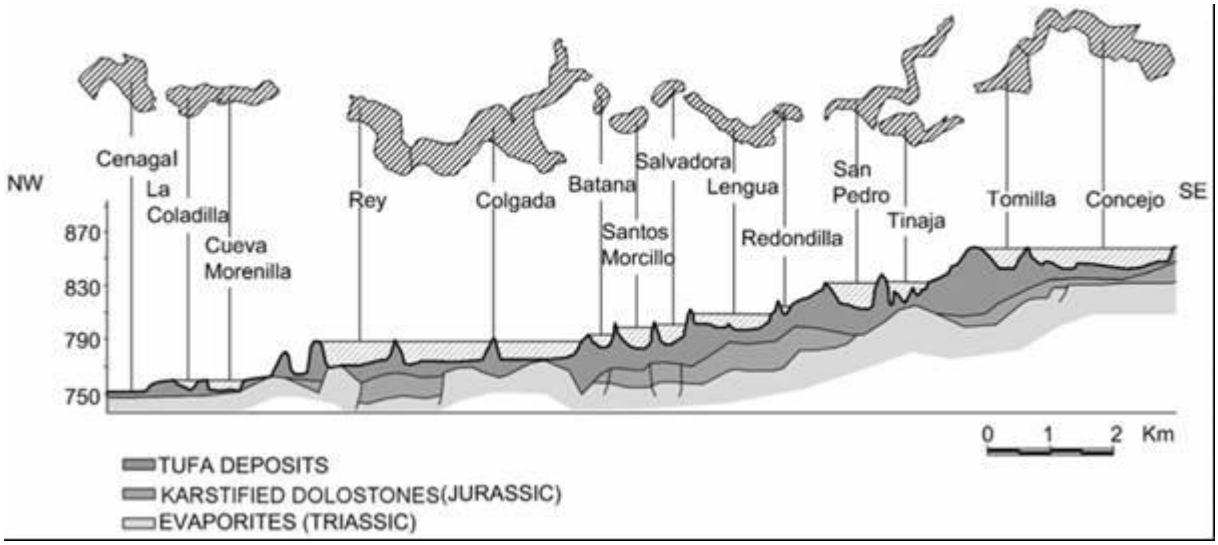
Oil on canvas to Manuel Barrón y Carrillo (1869) (Retrieved from https://www.carmenthyssenmalaga.org/obra/emboscada-a-unosbandoleros-en-la-cueva-del-gato)

Gato Cave waterfall (Retrieved from https://www.tripadvisor.es/Attraction_Review-g265784-d10236448-Reviews-Cueva_del_Gato-Ronda_Costa_del_Sol_Province_of_Malaga_Andalucia.html)

MIKAS - Lagunas de Ruidera

Retrieved from http://www.turismocastillalamancha.es/naturaleza/parquenatural-de-lagunas-de-ruidera-en-albacete-58272/descripcion/

Retrieved from https://www.viajesporcastillalamancha.es/rutas/id121-las-8-sendas-de-las-lagunas-de-ruidera.html



Cross section of lagunas Ruidera (Moya et al., 2018).

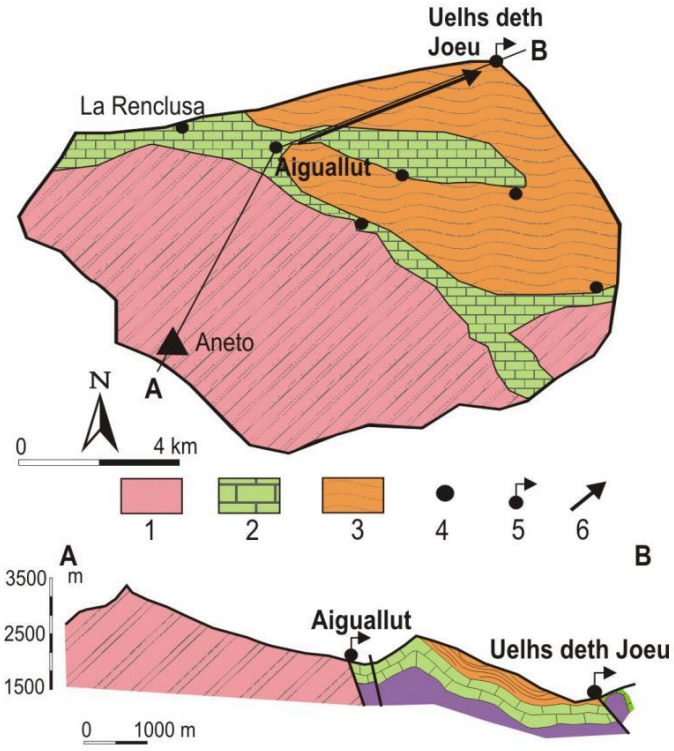
MIKAS - Nacedero de Arteta

Artazul waterfall (Retrieved from https://ca.wikiloc.com/rutessenderisme/ulzurrun-cascada-de-artazul-nacedero-de-arteta-66904099/photo-44160813) (left); Arteta Spring (from Alegría-Suescun, 2011) (Right)

Arteta Springflow

MIKAS - Uelhs deth Joèu

Photo of the Uelhs deth Joeu spring taken from the downstream perspective (taken from Andreu et al., 2016).



Hydrogeological section of the Aiguallut (swallet)-Uelhs deth Joeu (spring) system. Lithologies: 1) Hercinian granites, 2) Devonian limestones and 3) Carboniferous metapelites. Symbols: 4) swallet, 5) karst spring and 6) preferential groundwater flows (modified from Freixes, 2014).

MIKAS - Mundo River spring

Low-front views of the Mundo River spring during low flow (left) and flood (right) conditions (taken from García and Rodríguez-Estrella, 2003).

Close-up photography of the Mundo River spring in the summer season (taken from García and Rodríguez-Estrella, 2003).

Cave room with a wide variety of speleothems within Los Chorros cave system (taken from García and Rodríguez-Estrella, 2003).