

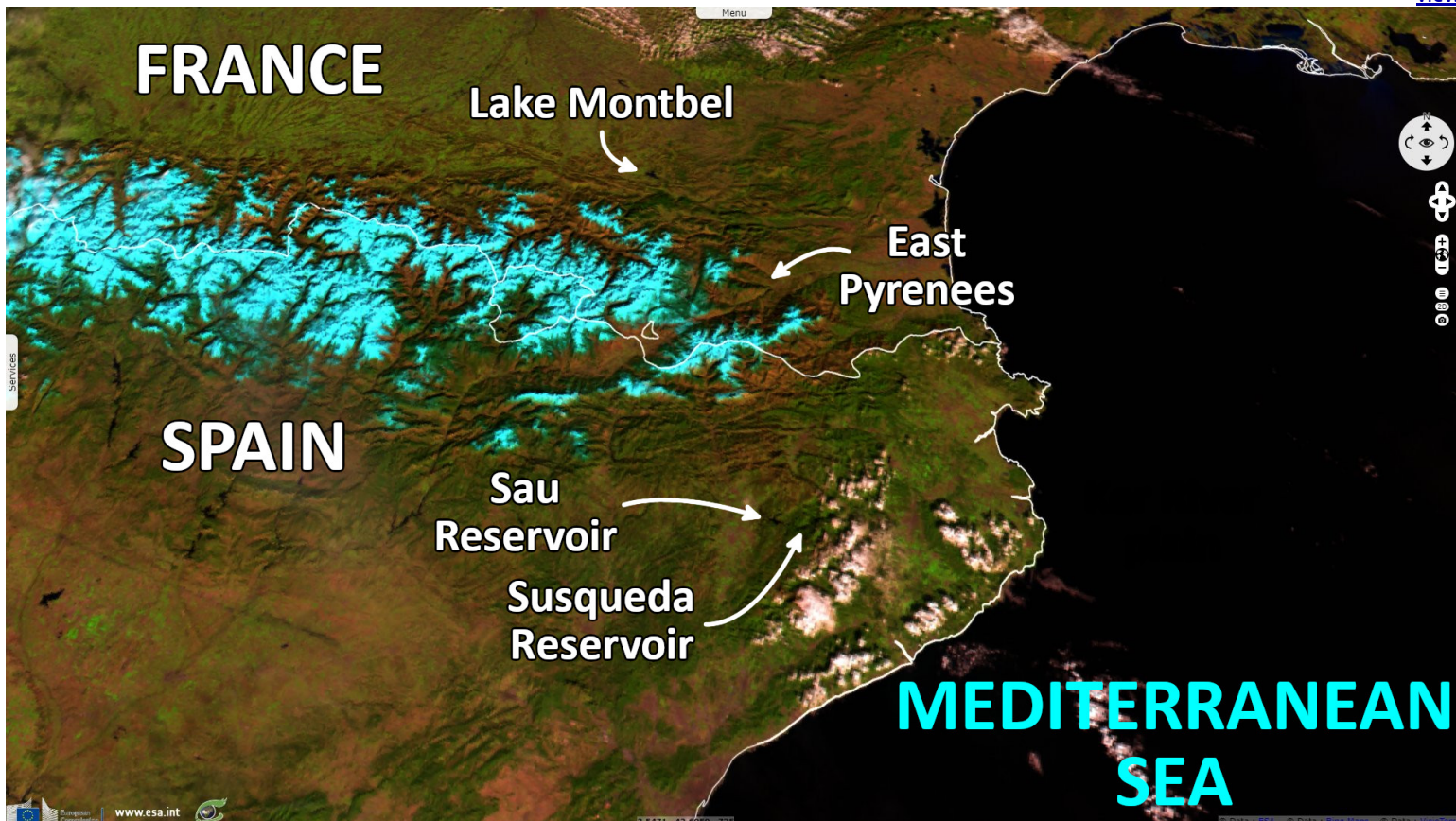
Early drought in the Eastern Pyrenees, Spain and France

Sentinel-2 MSI acquired on 11 February 2021 at 10:41:51 UTC
Sentinel-1 CSAR IW acquired on 15 February 2021 from 17:46:58 to 17:47:23 UTC
Sentinel-3 SRAL LAND acquired on 06 February 2023 at 10:11:53 UTC
Sentinel-2 MSI acquired on 16 February 2023 at 10:40:19 UTC
Sentinel-1 CSAR IW acquired on 17 February 2023 from 17:47:10 to 17:47:35 UTC

Author(s): Sentinel Vision team, VisioTerra, France - svp@visioterra.fr

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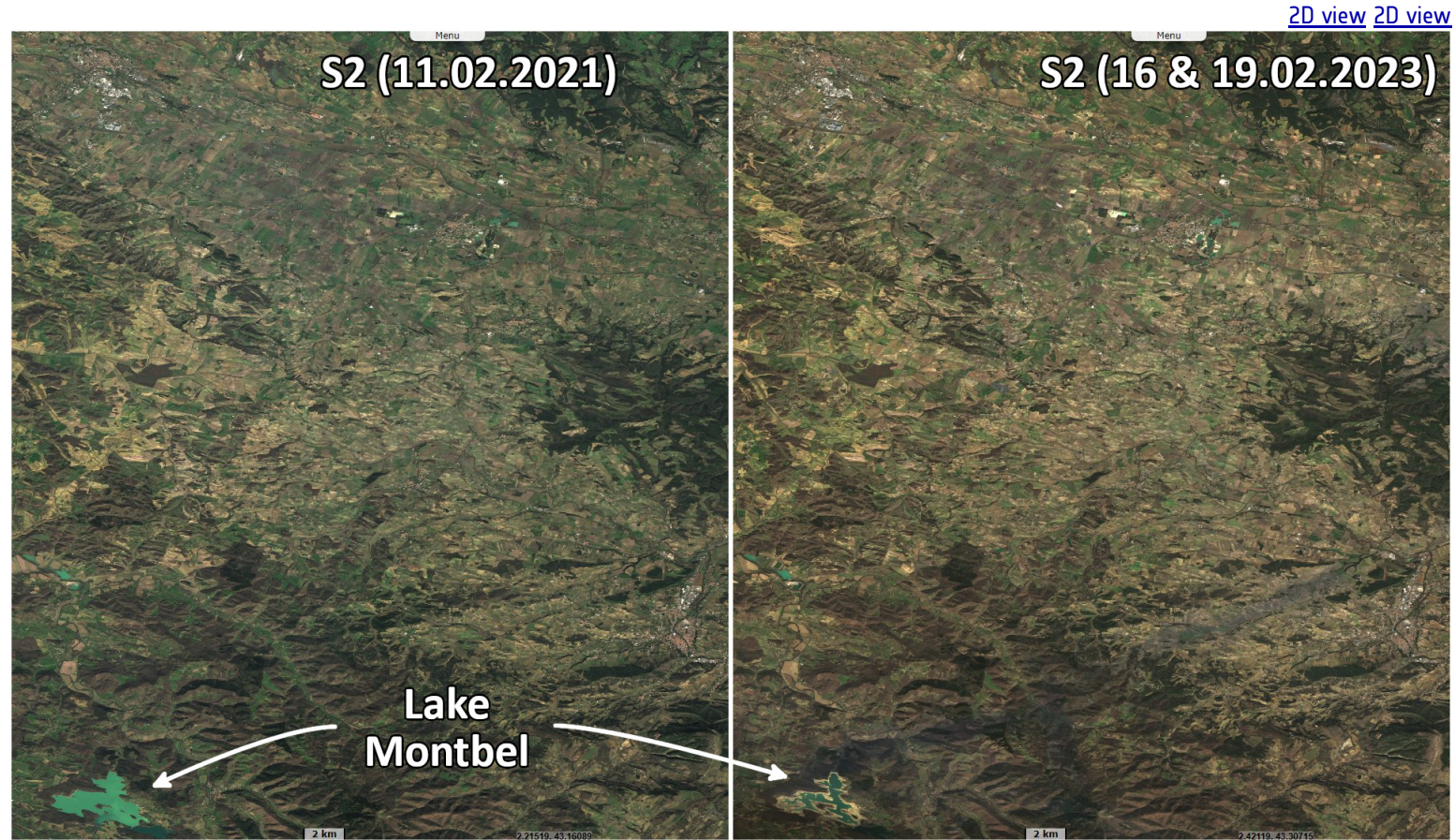
Fig. 1 - S3 SLSTR (11.02.2021) - S-W Europe faced a severe drought in 2022, the situation is already alarming in some of these regions for 2023. [2D view](#)



Christian Edwards and Gabby Gretener [published](#) an article for CNN warning of the potential effects of the drought currently affecting south-west Europe, in particular after the record drought that already hit the same regions last year: "A winter heatwave, record low levels of rain and a startling lack of snow in Europe are pushing rivers, canals and lakes across the continent to alarmingly low levels, with experts warning there could be repeat of last year's severe droughts."

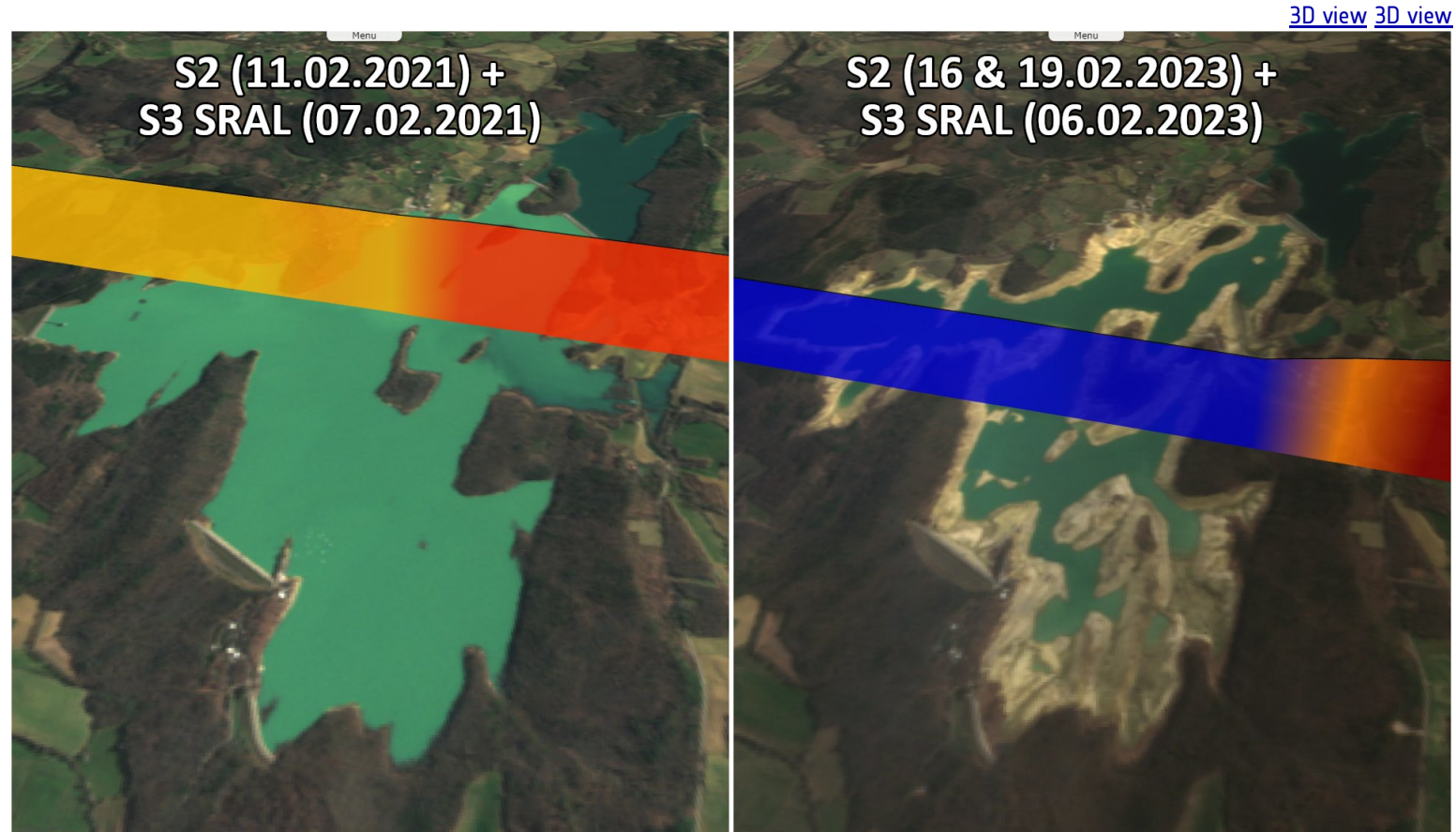
"An exceptionally warm and dry start to the year is affecting a swath of Europe, including central and southwest France, northern Spain and northern Italy."

Fig. 2 - S2 (11.02.2021 / 16 & 19.02.2023) - In the Eastern Pyrenees, west of Carcassone, the vegetation has already a yellow hue compared to 2021.



"France, which is experiencing its driest stretch in more than 60 years, may soon bring in water restrictions. The country 'suffered a series of 32 consecutive days without any significant rainfall from January 21 to February 21,' Simon Mittelberger, a climatologist at Météo-France, told CNN – the longest stretch since records began in 1959. It is having a damaging effect on the country's rivers and lakes, Mittelberger said, as well as the country's soils." "France's current soil moisture levels would not normally be seen until mid-April."

Fig. 3 - S2 (11.02.2021) + S3 SRAL (07.02.2021) / S2 (16 & 19.02.2023) + S3 SRAL (06.02.2023) - Lake Montbel has lost most of this surface and volume.

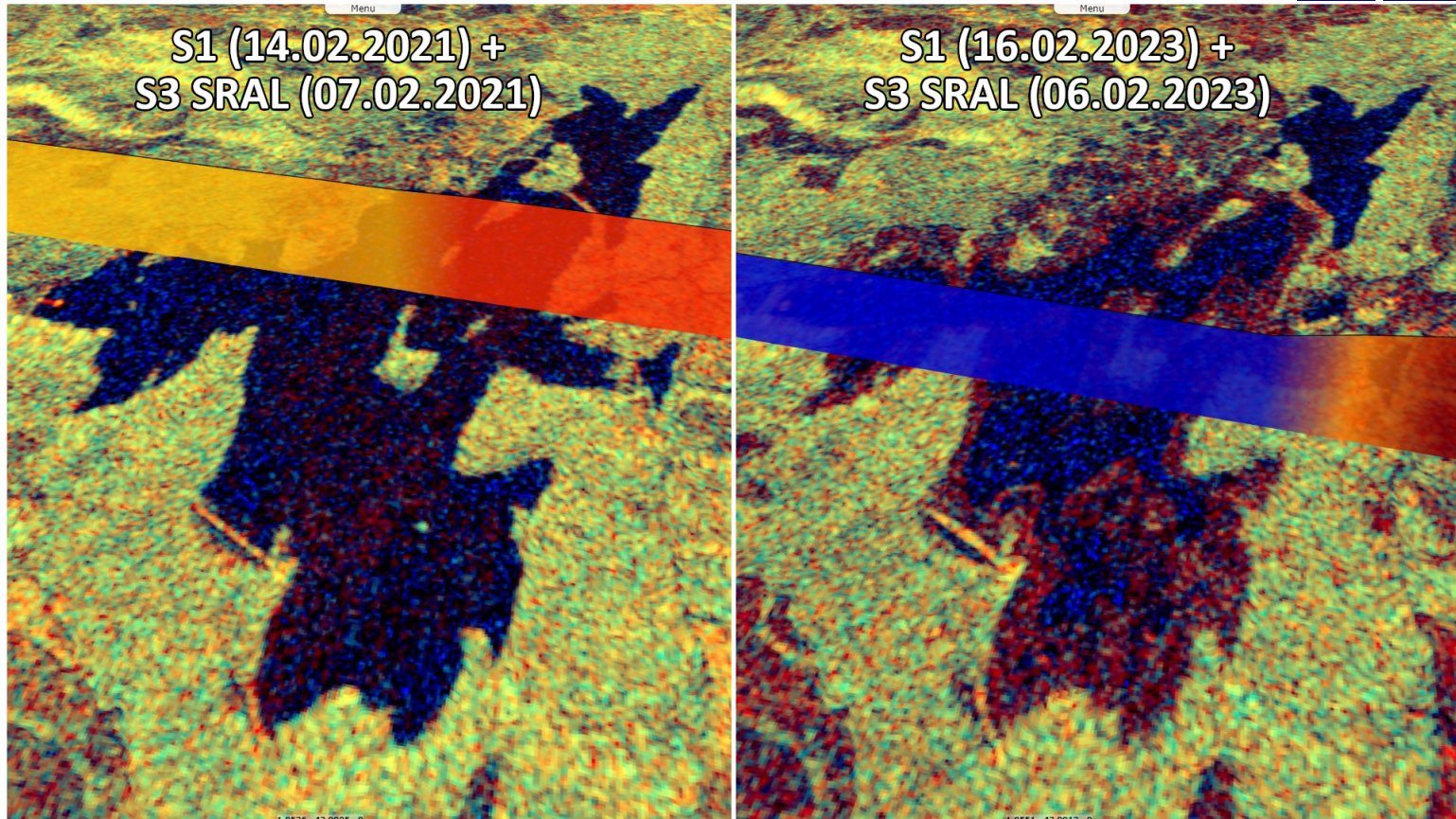


"Snowfall has also been low. 'The situation in the Pyrenees is close to the lowest record of snow quantity for that time of year,' Mittelberger said. The Alps have seen 63% less snow than usual, according to CIMA Research Foundation. A lack of snow in the winter can threaten water reserves in the spring and summer, as there is less snowmelt to sustain rivers.

Last summer, France suffered its worst drought on record but, Mittelberger warned, this year 'the situation could be worse if we don't have significant rainfall in the next couple of months.' Christophe Béchu, the minister for ecological transition, called the winter drought 'unprecedented,' and warned the country is in a state of alert."

Fig. 4 - S1 (14.02.2021) + S3 SRAL (07.02.2021) / S1 (16.02.2023) + S3 SRAL (06.02.2023) - It should be refilled by winter rain at this time of the year.

[3D view](#) [3D view](#)



"In Italy, some of country's most famous bodies of water are drying up. Water levels at Lake Garda are so low that it is now possible to walk to an island in the middle, along a strip of exposed lake bed. A few months ago, this walkway did not exist. It is now also a lot harder to take a water taxi in Venice, as some of its canals have become too shallow to keep gondolas afloat, in part, because of a lack of rainfall. The city which has long feared flooding is now grappling with the opposite problem", the CNN article [continues](#).

Fig. 5 - S2 (11.02.2021 / 16 & 19.02.2023) - On the Spanish side, the banks Sau Reservoir are showing, its tail is brownish.

[3D view](#) [3D view](#)

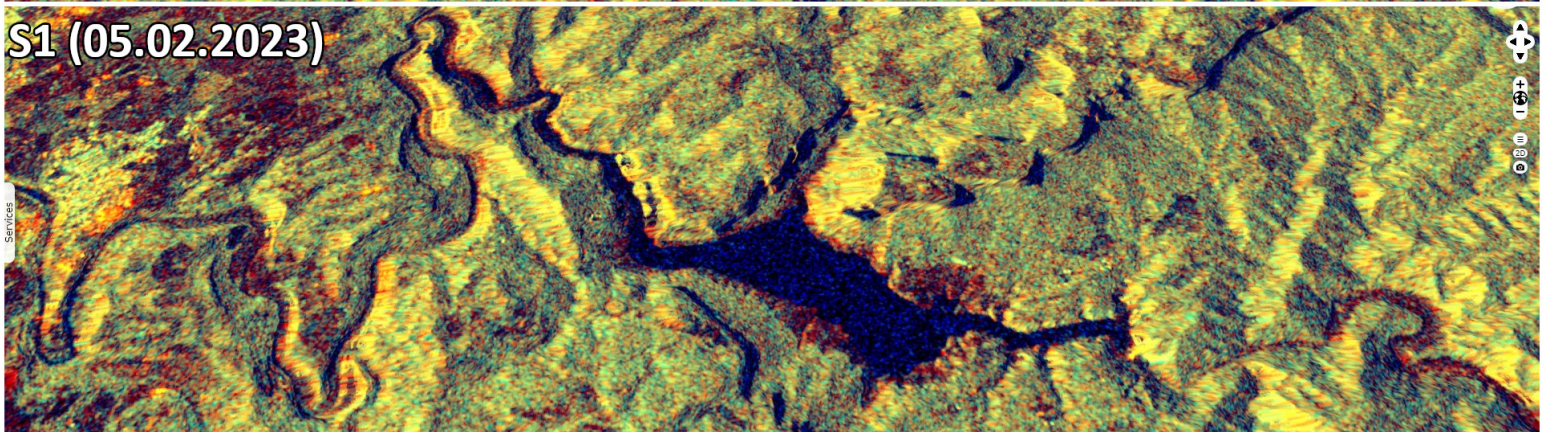
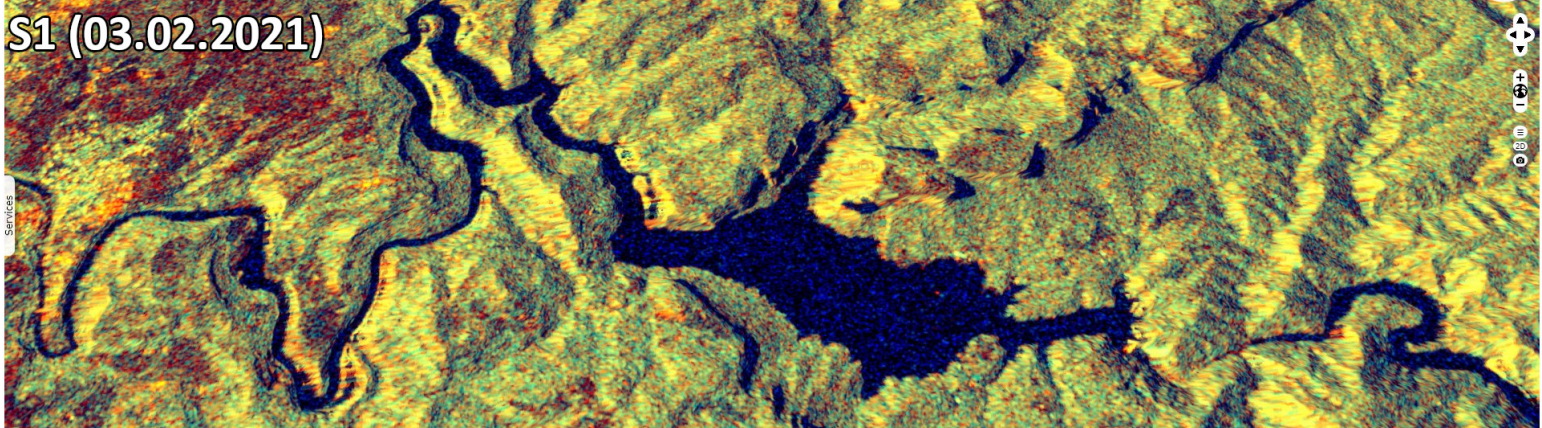


"Italy's longest river, the Po, which winds through its northern agricultural heartland, has 61% less water than usual for this time of year. Last summer, the Italian government declared a state of emergency for the area surrounding the Po, which experienced its worst drought in 70 years.

Giorgio Zampetti, general manager of Legambiente, an Italian environmental group, fears that the worst is yet to come: '2023 has just begun, but it is showing worrying signs in terms of extreme weather events [and] drought levels,' he said in a press statement."

Fig. 6 - S1 (03.02.2021 / 05.02.2023) - It is also far from recharged from last year deficit in precipitations.

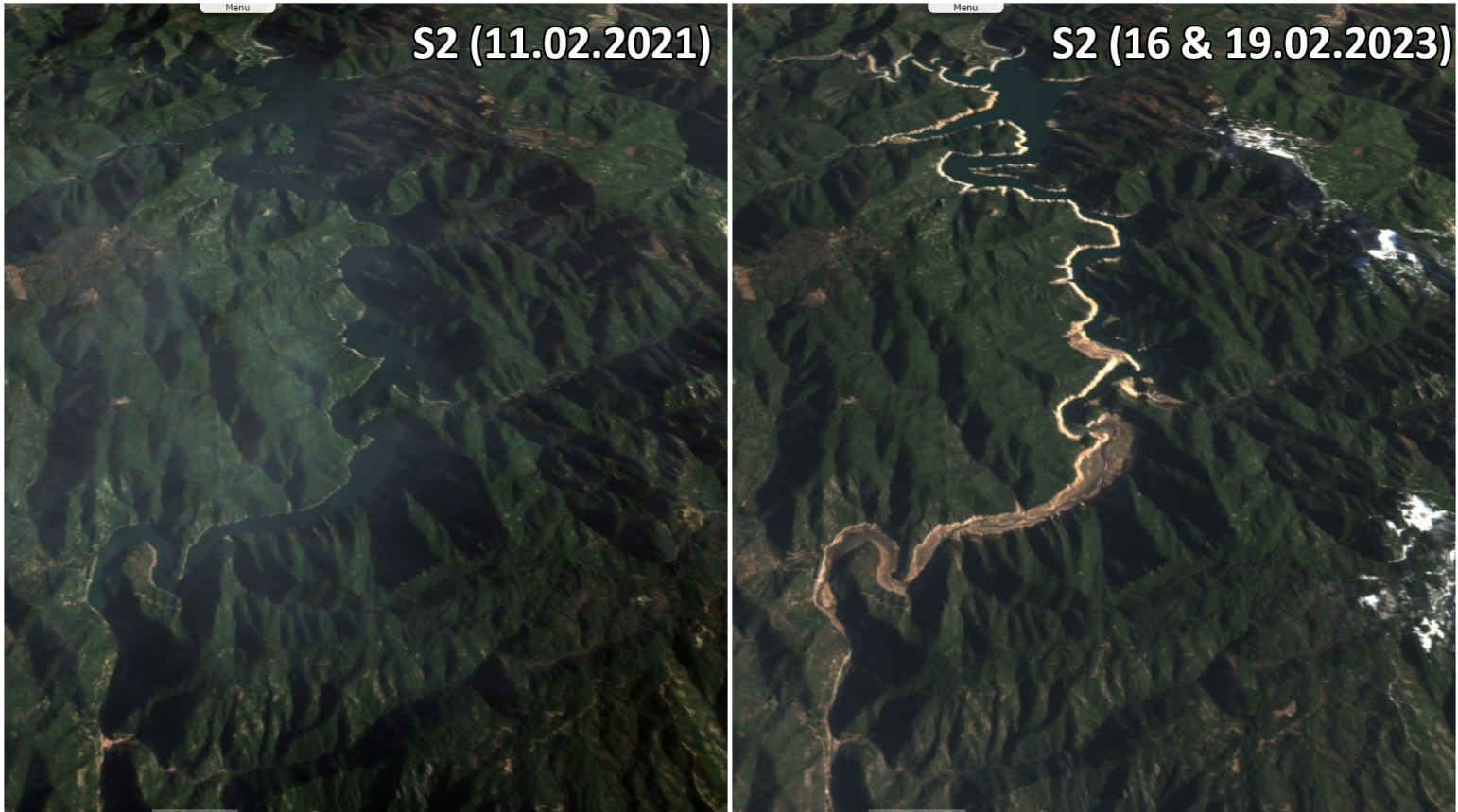
[3D view](#) [3D view](#)



"In Spain, which experienced its hottest year on record last year, there are concerns about water supplies. 'We cannot guarantee water supply for drinking water or for economic uses by relying exclusively on rain,' Teresa Ribera, Minister for the Ecological Transition recently said at a press conference."

Fig. 7 - S2 (11.02.2021 / 16 & 19.02.2023) - Just downstream, the tail of Susqueda Reservoir is dry

[3D view](#) [3D view](#)

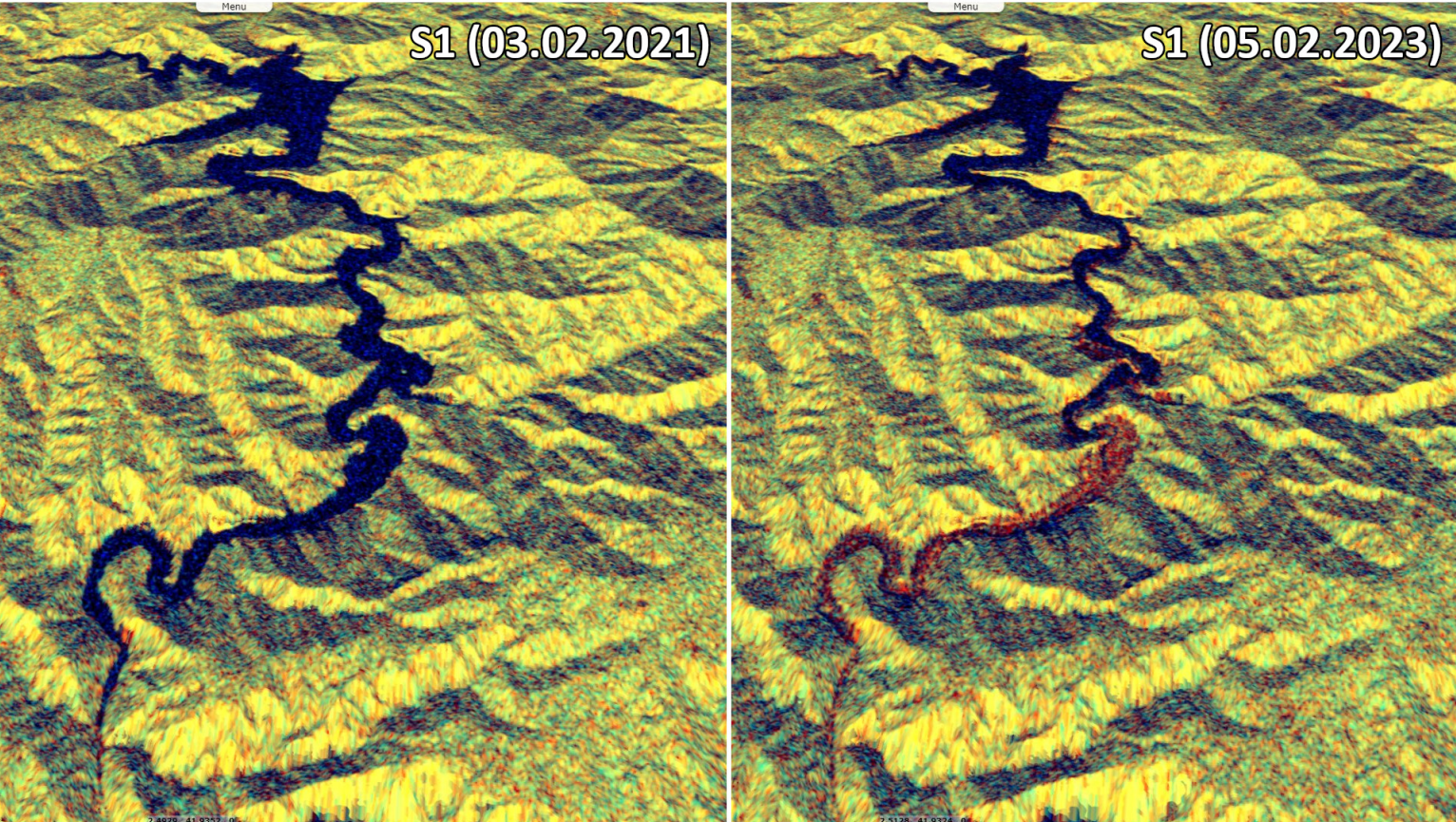


"While Europe has previously been blighted by summer droughts, experts fear the exceptionally dry last two months may signal a new reality, caused in part by rising average global temperatures.

'These conditions were rare in the past, but climate change is altering precipitation regimes over Europe and making these extremes more recurrent and intense,' Andrea Toreti, a climatologist at the European Commission's Joint Research Centre, told CNN."













Fig. 8 - S1 (03.02.2021 / 05.02.2023) - These two dams lakes are just connected by a trickle of water.

[3D view](#) [3D view](#)



Christian Edwards [concludes](#): "'There is a growing concern due to the lack of precipitation in the last weeks and also considering the 2022 drought. The coming weeks will be crucial,' Toreti said. While Toreti said attributing the winter drought to climate change would require a specific analysis that has not yet been conducted, he added such events "are an expected effect of climate change in terms of more frequent and intense extremes."

*The views expressed herein can in no way be taken to reflect the official opinion of the European Space Agency or the European Union.
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