

ArcCatalog and ArcToolbox) integrated into ArcGis, all GIS tasks were performed, including mapping, data management, geographic analysis, data updating and geoprocessing.

The generated maps demonstrate a direct relationship between precipitation rates and the lake's water level. It is worth noting that the fluctuation of the water surface, driven by inflows and outflows, depends on the lake's feeding sources, which include the surrounding mountains and wadis (El Mellah, El Hout, and Zied). These inflows are crucial for the lake's sustainability.

Results and concluding remarks

The generated maps demonstrate a direct relationship between precipitation rates and the lake's water level. It is worth noting that the fluctuation of the water surface, driven by inflows and outflows, depends on the lake's feeding sources, which include the surrounding mountains and wadis (El Mellah, El Hout, and Zied). These inflows are crucial for the lake's sustainability.

What has been observed is that the lake's extent changes according to the seasons and the rainfall conditions of each year (rainy or dry). This variability makes the lake particularly vulnerable to seasonal mineralization processes.

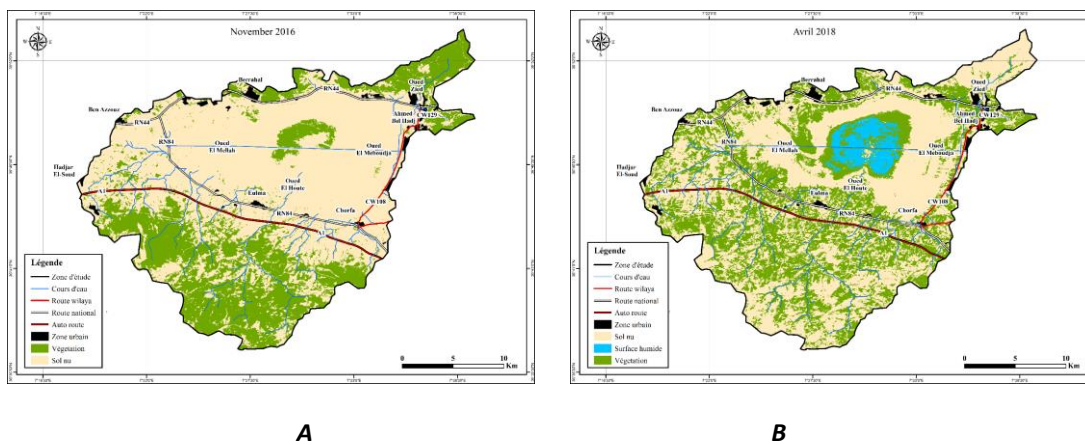


Fig. 3: Hydrological Situation of Lake Fetzara in November 2016 (A) and March 2018 (B).

Conclusion:

After observing the maps, we found the existence of a cause and effect relationship between precipitation and the water volume in the lake. The observed fluctuation in the water surface between inflows and outflows is linked to contributions from the surrounding mountains and the wadis (El Mellah, El Hout, and Zied) that flow into the lake. These inflows ensure the lake's sustainability.

It is evident that the lake's extent varies depending on whether the years are rainy or dry. This seasonal variability makes the lake particularly interesting due to the renewed mineralization processes that occur each season.

References

- DGF. (2003). *Descriptive Sheet on Ramsar Wetland Sites: Lake Fetzara, Annaba Province*. General Directorate of Forests (DGF).
- Saifouni, A. (2021). *Wetlands in Algeria: Proposal for a New Classification, National Inventory, and Typology*. Doctoral Thesis, National Higher School of Agronomy (ENSA), El-Harrach, Algiers, 282 p, with annexes.
- Bouhali, Z., Djabri, L., Bouguerra, H., Trabelsi, F., Hani, A., & Chaffai, H. (2022). Use of artificial neural networks for modeling inflow, outflow, and salinity of Lake Fetzara in the Annaba region (N.E. Algeria). *Journal of Food Industry and Agriculture*, 107-115. Available at: www.fia.usv.ro/fiajournal
- Djamaï, R., Fadel, D., Laïfa, A., Benslama, M., Daoud, Y., & Vallès, V. (2011). The concept of residual alkalinity and the geochemical evolution of processes: Application to saline soils of Lake Fetzara (Northeastern Algeria). *Synthesis Review of Science and Technology*, 23: 90–98 (in French).