

Analysis of the Main Physical Properties of Seawater along the Coast of Angola

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1. INTRODUCTION & AIM

Introduction:

- The Angolan coast plays a crucial role in circulation, biogeochemical cycles, and fisheries productivity.
- Understanding the temporal and spatial variability of key physical properties such as temperature, salinity and density is fundamental for monitoring climate change effects and ocean dynamics.
- Despite its importance, few studies have comprehensively analyzed seawater properties along the Angolan coast, using Ocean Database.

Aims:

- To analyze the spatial and temporal variation of seawater temperature, salinity, and density along the Angolan coast.
- To identify seasonal and interannual trends in these physical properties.
- To apply statistical and graphical tools (Ocean Data View) for data processing and visualization.

2. METHOD

Data Source:

- World Ocean Database (WOD) – CTD and bottle data from 1980 – 2023.
- Sampling stations distributed along the northern, central and southern coastal sectors of Angola.

Tools and Software:

- Ocean Data View (ODV) for data visualization and interpolation

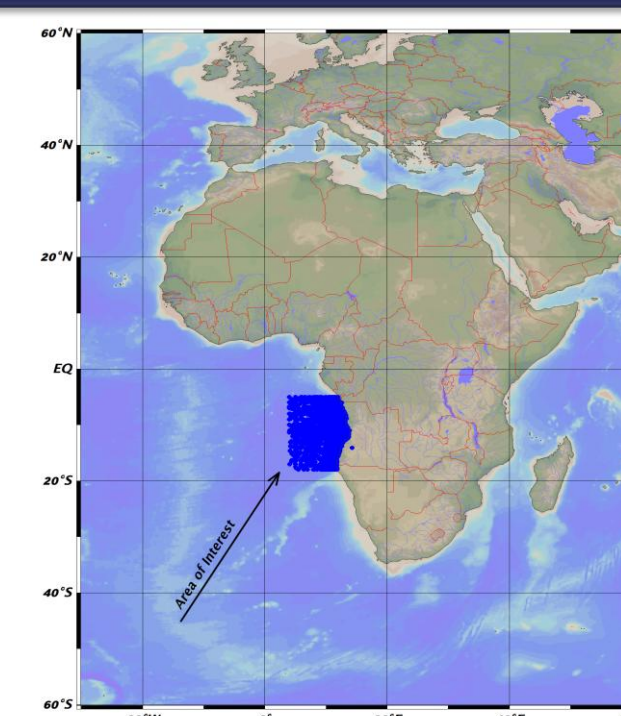


Figure 1. Area of study – Angolan coast.

3. RESULTS & DISCUSSION

Results:

- Temperature:** Higher in the north (Luanda region) and lower in the south (Namibe).
- Seasonal variation influenced by Benguela upwelling.
- Salinity:** Gradual increase southward; affected by river discharge (Cuanza, Congo).
- Density:** Strong correlation with temperature ($r > 0.85$); denser waters in the southern region.
- Trends:** Slight warming ($\approx +0.015^\circ\text{C}/\text{year}$) observed over the last 40 years.

Discussion:

- Spatial patterns reflect the interaction between the Angola Current and the Benguela Upwelling System.
- Temporal trends indicate progressive warming, consistent with global climate patterns.
- Identified data gaps highlight the needs for long-term oceanographic monitoring in Angolan waters.

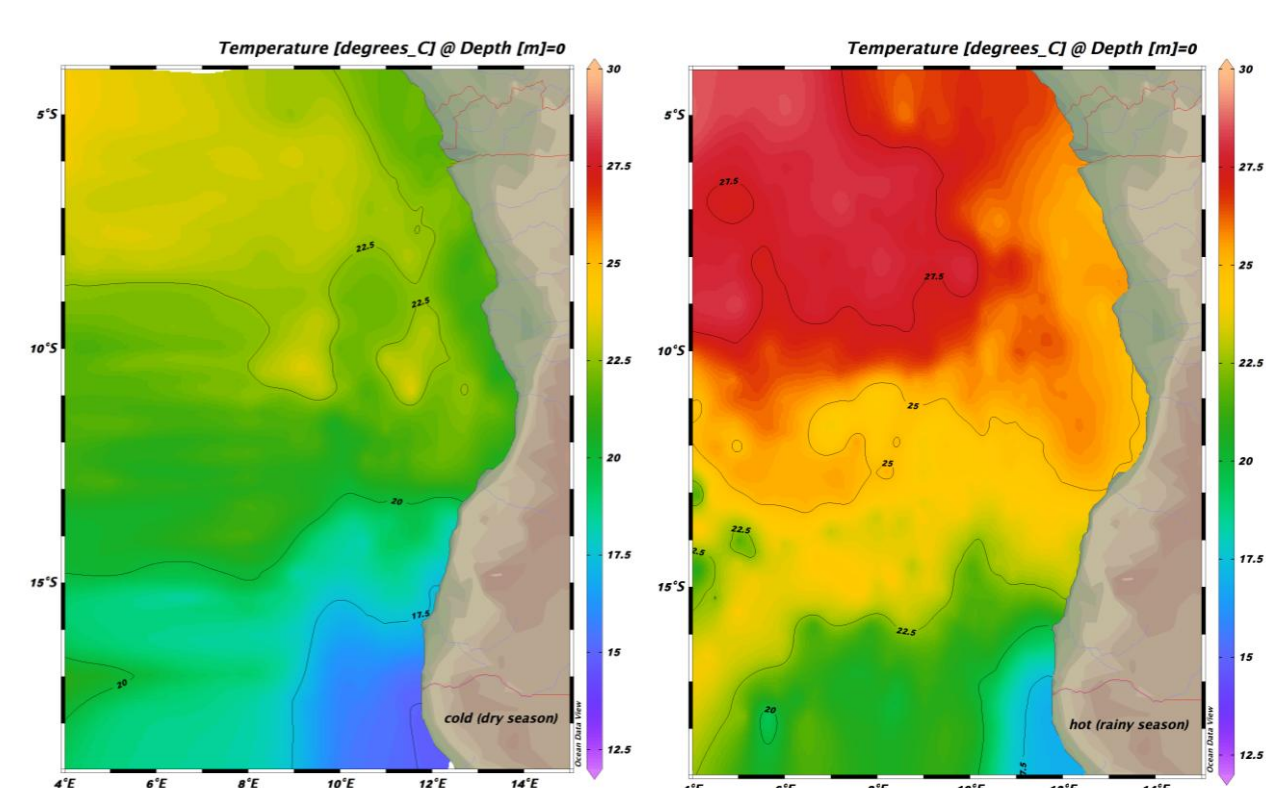


Figure 2. Average sea surface temperature on the coast of Angola in dry (left) and rainy (right) seasons.

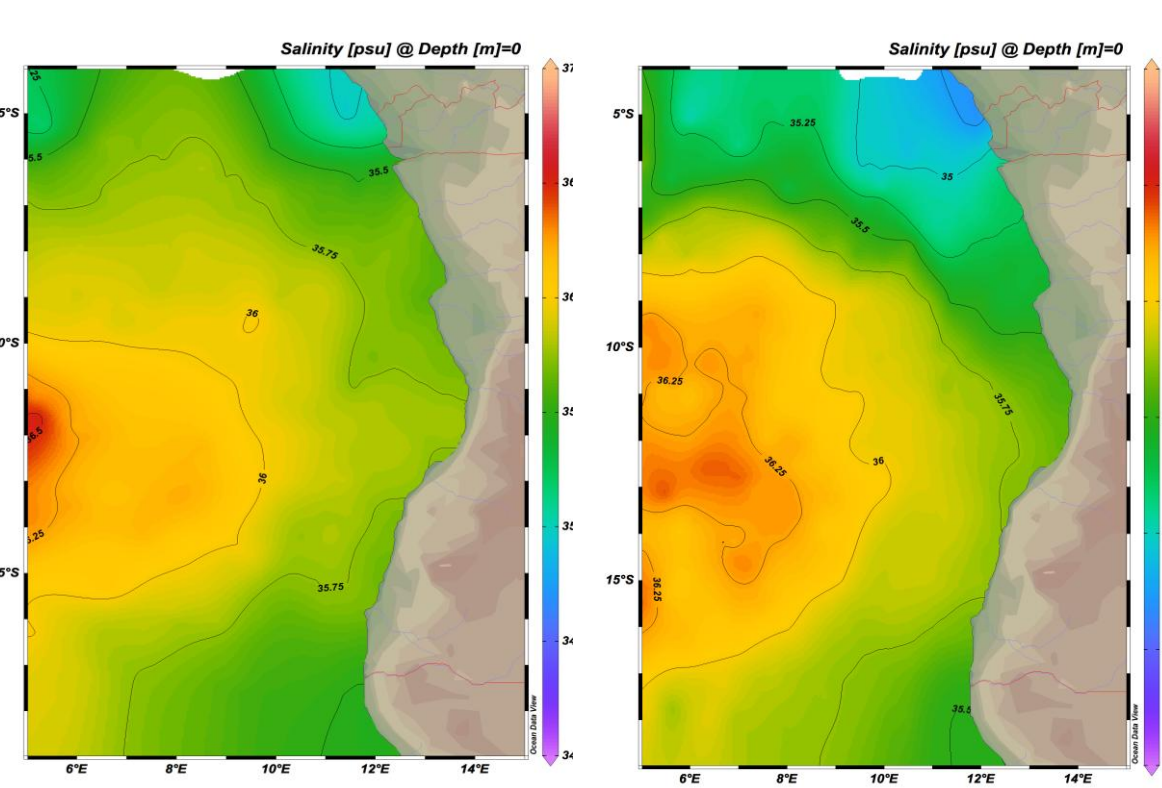


Figure 3. Average sea salinity of seawater surface on the coast of Angola in dry (left) and rainy (right) seasons.

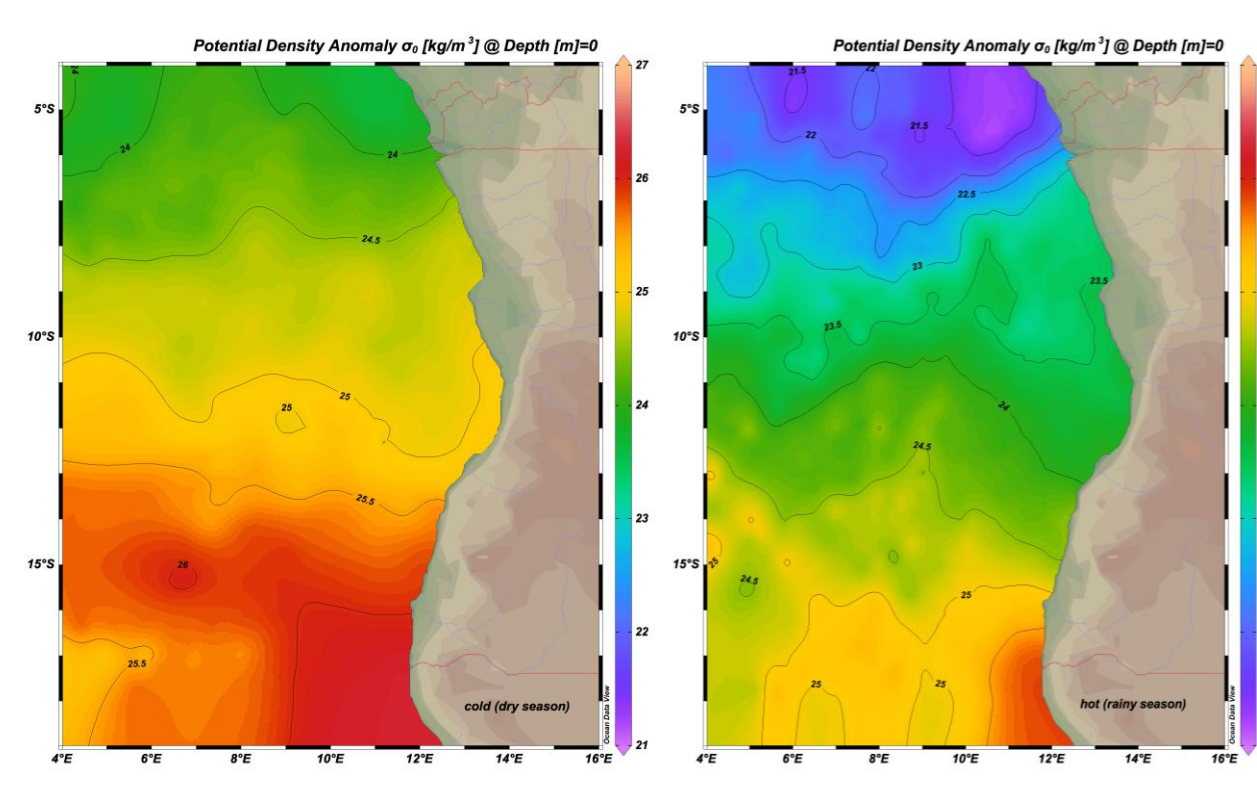


Figure 4. Density distribution on the coast of Angola in dry (left) and rainy (right) seasons.

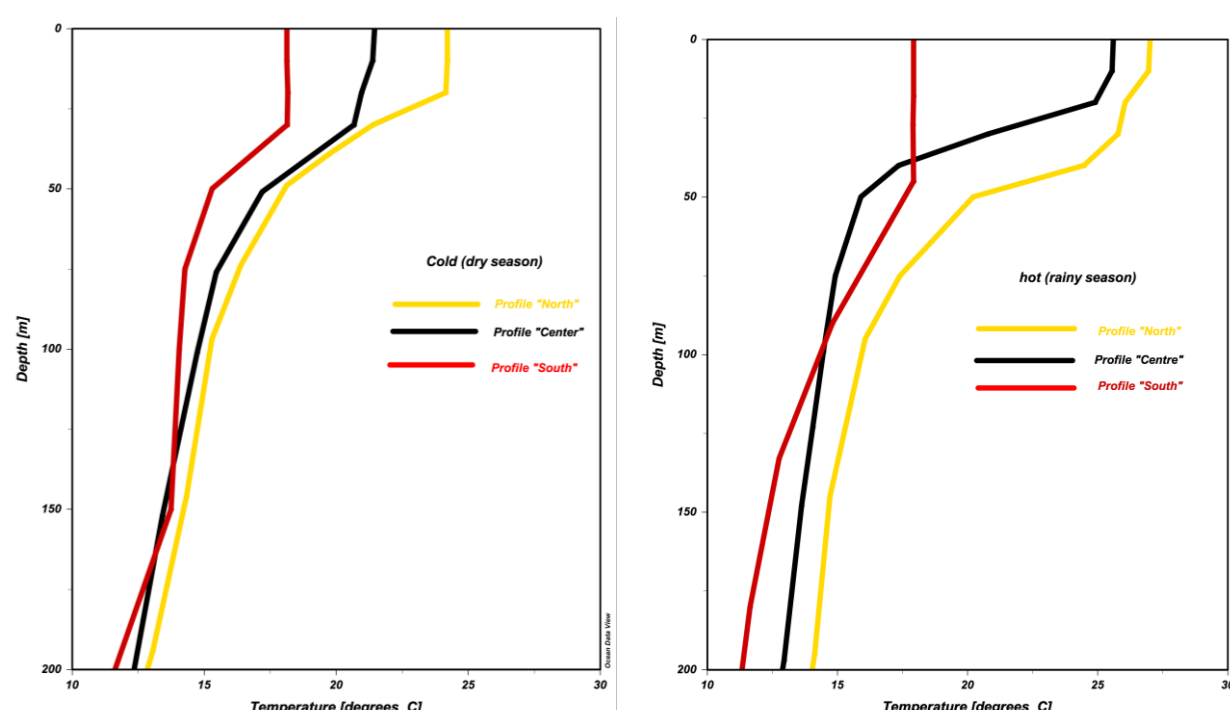


Figure 5. Vertical temperature profiles on the coast of Angola in the dry (left) and rainy (right) seasons.

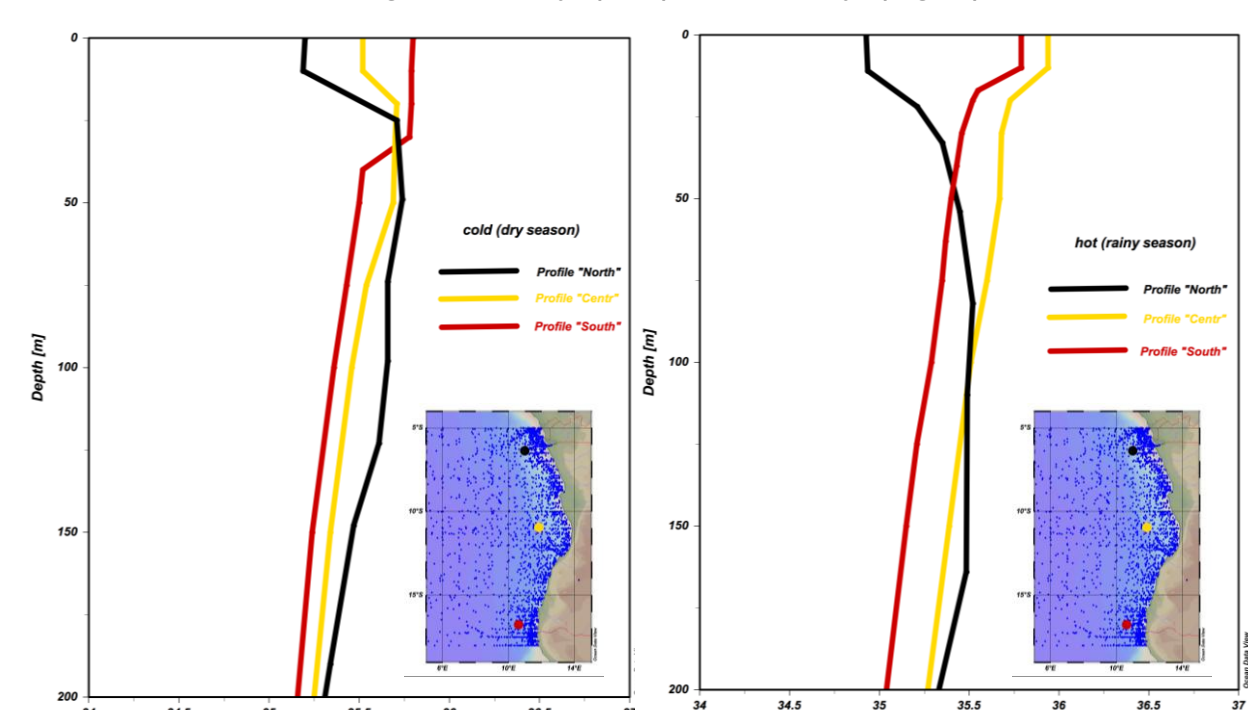


Figure 6. Typical salinity profiles on the coast of Angola. dry (left) and rainy (right) seasons, at 3 different points: "North", "Central" and "South" Profiles.

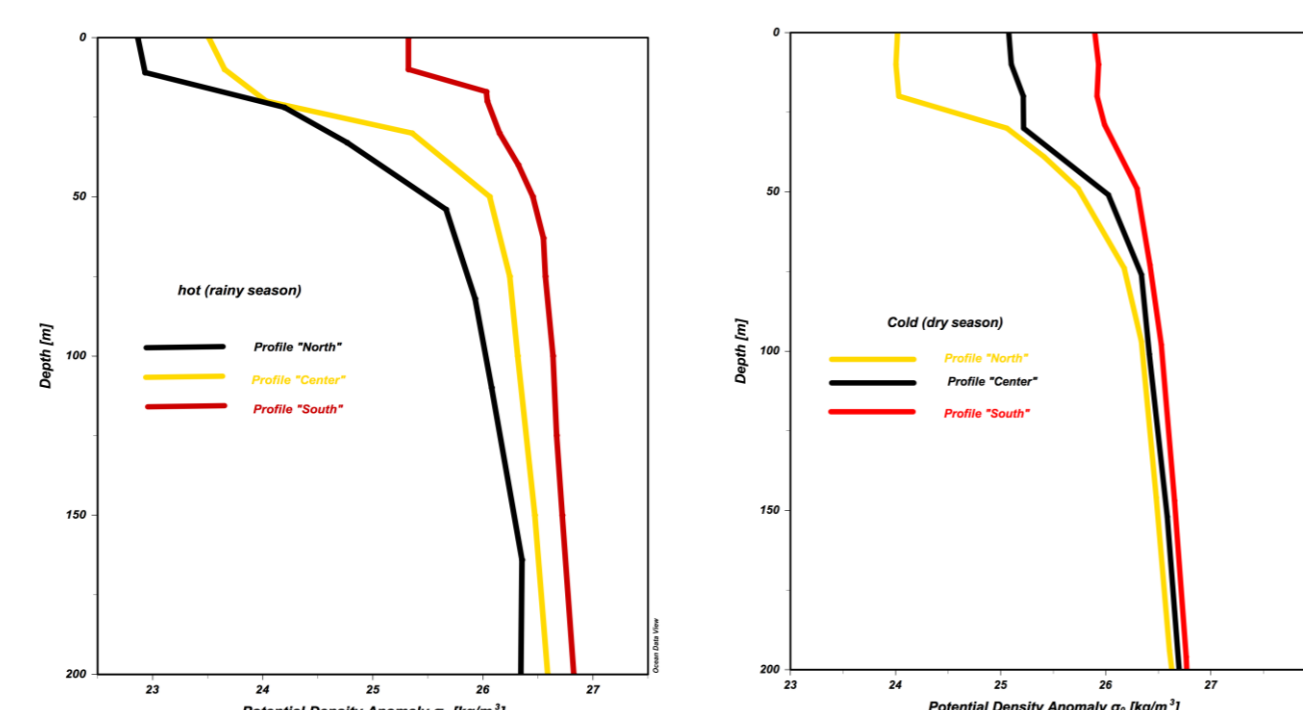


Figure 7. Vertical density profiles on the coast of Angola in the dry (left) and rainy (right) seasons.

4. CONCLUSION

- The analysis of the physical properties of seawater along the coast of Angola revealed patterns consistent with regional circulation, dominated by Benguela Current and upwelling processes.
- Temperature and Salinity show consistent spatial gradients and temporal trends.
- Integration of global databases with opensource analysis tools provides a cost-effective framework for marine research in Angola.

5. FUTURE WORK / REFERENCES

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