



Pole for Doctoral Studies  
Center for Doctoral Studies  
Sciences, Technologies, and Medical Sciences

## ANNOUNCEMENT OF DOCTORAL THESIS DEFENSE



**Ms. BOUAZZATI Hasna**

**Will present here research work with the aim of earning a  
Doctorate**

**Doctoral program: Biology, Chemistry, and Geology**

**Discipline: Earth Sciences**

**Specialty: Oceanography – Environmental Sciences**

**On 17/09/2025 at 11H 00 at the Thesis defense hall at the Faculty  
of Sciences of Tetouan, UAE**

**Under the Theme**

**THE RESILIENCE OF MARINE PROTECTED AREA OF  
AL HOCEIMA (NORTH OF MOROCCO) TO CLIMATE  
CHANGE**

**Front of the jury composed of :**

First Name & Last Name	Establishment	Designation
Pr. STITOU EL MESSARI Jamal Eddine	FS of Tetouan, UAE	President
Pr. ABOUMARIA Khadija	FST of Tangier, UAE	Reviewer
Pr. EL OUARGHI Hossain	ENSA of Al Hoceima, UAE	Reviewer
Pr. MAANAN Mehdi	FS of Ain Chok Casablanca,UH2	Reviewer
Pr. EL TALIBI Hajar	FST of Al Hoceima, UAE	Examiner
Pr. MORARECH Moad	FS of Tetouan, UAE	Examiner
Pr. NACHITE Driss	Independent Reasercher	Expert
Pr. EL M'RINI Abdelmounim	FS of Tetouan, UAE	Supervisor

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## Abstract



The resilience of marine ecosystems to the multifaceted pressures of climate change and anthropogenic activities is a pressing concern, particularly in the Mediterranean. This thesis investigates the Al Hoceima Marine Protected Area (MPA) in Morocco, a critical biodiversity hotspot within the Mediterranean, and its resilience to such challenges. The Al Hoceima Marine Reserve, known for its rich biodiversity and critical habitats, faces significant threats due to climate change and pollution. These challenges are compounded by the difficulties in designing and managing climate-resilient MPAs, which must respond to dynamic and widespread climate effects.

The research aims to address key gaps in understanding the resilience mechanisms within the Al Hoceima Marine Reserve. Current strategies in the Mediterranean, while emphasizing ecological resilience, often lack site-specific assessments that integrate socio-economic, ecological, and technological data streams to provide holistic insights. This thesis highlights the importance of understanding resilience mechanisms and how innovative approaches, such as the use of Autonomous Underwater Vehicles (AUVs) and platforms like Odyssea, can contribute to data-driven conservation efforts. The research objectives focus on assessing the role of the Al Hoceima Marine Reserve in mitigating climate impacts, the effectiveness of innovative technological tools in marine conservation, and identifying gaps in existing management plans to propose sustainable adaptation strategies.

The research aims to build an integrated understanding of the ecological dynamics, socio-economic influences, and environmental pressures faced by the MPA.

It reveals how the Al Hoceima Marine Reserve serves as a buffer against pollution and climate impacts, highlighting its role in biodiversity conservation and ecosystem resilience. Management gaps are identified, particularly in addressing climate change and microplastic pollution, with suggestions for incorporating advanced technologies like AUVs and satellite monitoring to enhance adaptive management strategies. Practical examples from other MPAs are highlighted to illustrate actionable steps for MPA managers in enhancing climate resilience.

The study underscores the potential for replicating its findings in similar ecosystems, emphasizing the importance of innovative, data-driven approaches in marine conservation. Finally, the conclusion calls for future research to focus on long-term monitoring and the development of integrated adaptation measures that encompass ecological, technological, and socio-economic dimensions, thereby sustaining marine biodiversity and supporting the blue economy.

**Keywords :** Al Hoceima Marine Protected Area, Climate Change Resilience, Marine Conservation, Autonomous Underwater Vehicles, Odyssea Platform, Adaptive Management, Blue Economy.