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SALAH BOUBNIDER UNIVERSITY, CONSTANTINE 3  
INSTITUTE OF URBAN TECHNIQUES MANAGEMENT  
DEPARTMENT OF CITY MANAGEMENT AND URBANIZATION

**MEHmed**  
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**Master's Thesis**

**Field:** Urban Techniques Management

**Specialization:** Environmental Change Management in the Mediterranean MEHmed

**Impacts of Port Activities on the Environment**

**Case Study: Port of Annaba**

**SIG and Remote Sensing Approach**

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## Abstract

Under the COP27, coastal cities have taken a significant portion, insisting on the need to address the problems of ports and ship transportation due to their detrimental effects on the environment and their contribution to climate change. The city of Annaba is one of the major cities with a bustling port and a prominent position in the country. However, it generates numerous problems that pose threats to human health and the environment. Through the conducted analyses in this study, it has been revealed that the port of Annaba negatively impacts the city and its climate, generating three primary types of pollution that affect air quality through greenhouse gas emissions, marine environment, and noise pollution for both residents and marine organisms, this study further emphasized that the integration of Geographic Information Systems and remote sensing in ports contributes to the sustainable management of port operations and facilitates continuous monitoring of the city's surroundings.

**Key-words:** Ports, maritime transport, environmental climate change, Geographic Information Systems, remote sensing.

## Résumé

Dans le cadre de COP-27, les villes côtières ont pris une part importante, insistant sur la nécessité de résoudre les problèmes des ports et du transport maritime en raison de leurs effets préjudiciables sur l'environnement et de leur contribution au changement climatique. La ville d'Annaba est l'une des grandes villes dotées d'un port animé et jouissant d'une position importante dans le pays. Cependant, elle génère de nombreux problèmes qui menacent en premier lieu la santé humaine et l'environnement en permanence. Les analyses réalisées dans cette étude ont révélé que le port d'Annaba a un impact négatif sur la ville et son climat, générant trois principaux types de pollution qui affectent la qualité de l'air par le biais des émissions de gaz à effet de serre, l'environnement marin et la pollution sonore pour les habitants et les organismes marins. Cette étude a également affirmé que l'intégration des systèmes d'information géographique et de la télédétection dans les ports contribue à la gestion durable des opérations portuaires et facilite la surveillance continue de l'environnement de la ville.

**Mots-clés :** Ports, transport maritime, changement climatique environnemental, systèmes d'information géographique, télédétection.

## التلخيص

في إطار مؤتمر شرم الشيخ للتغير المناخي 2022، لعبت المدن الساحلية دورا مهما، مؤكدة على ضرورة حل مشاكل الموانئ والنقل البحري لما لها من آثار ضارة على البيئة ومساهمتها في التغير المناخي. مدينة عنابة هي واحدة من المدن الرئيسية ذات الميناء الحيوي والذي يتمتع بمكانة مهمة في البلاد ومع ذلك، فإنه يولد العديد من المشاكل التي تهدد صحة الإنسان والبيئة في المقام الأول بشكل دائم. كشفت التحليلات التي أجريت في هذه الدراسة أن ميناء عنابة له تأثير سلبي على المدينة ومناخها، حيث يولد ثلاثة أنواع رئيسية منها التلوث الهوائي من خلال انبعاثات غازات الاحتباس الحراري و تلوث البيئة البحرية الذي يؤثر على الكائنات البحرية و اخرها التلوث الضوضائي للسكان .

كما أبرزت الدراسة أن تكامل نظم المعلومات الجغرافية والاستشعار عن بعد في الموانئ يساهم في الإدارة المستدامة لعمليات الموانئ ويسهل المراقبة المستمرة لبيئة المدينة.

**الكلمات الرئيسية:** الموانئ، النقل البحري، التغير المناخي البيئي، أنظمة المعلومات الجغرافية، الاستشعار عن بُعد