

Impact of landfill leachate on groundwater quality (Case of Mediouna landfill, Casablanca, Morocco)

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Introduction

The uncontrolled Mediouna landfill sited on old quarries since 1986, nearby the main road connecting Casablanca to Marrakec (fig.1). It is installed without any leachate collected system, and it has a huge threatens on groundwater quality.

In order to assess groundwater quality contaminated by landfill leachate, a number of wells water were collected and hydrochemical analyses were measured. Furthermore, for delineate the extension of pollution downstream of landfill, a monitoring was excuted in three periods (2001, 2011, 2014) which those of 2011 and 2011 was assessed by Fekri and Smahi, respectively.

The climate of the study area is semi arid. Groundwater flow in fractured hard rock characterized by Primary mudstone and quartzite, overcoming by Quaternary limestone dune parallel to shore.

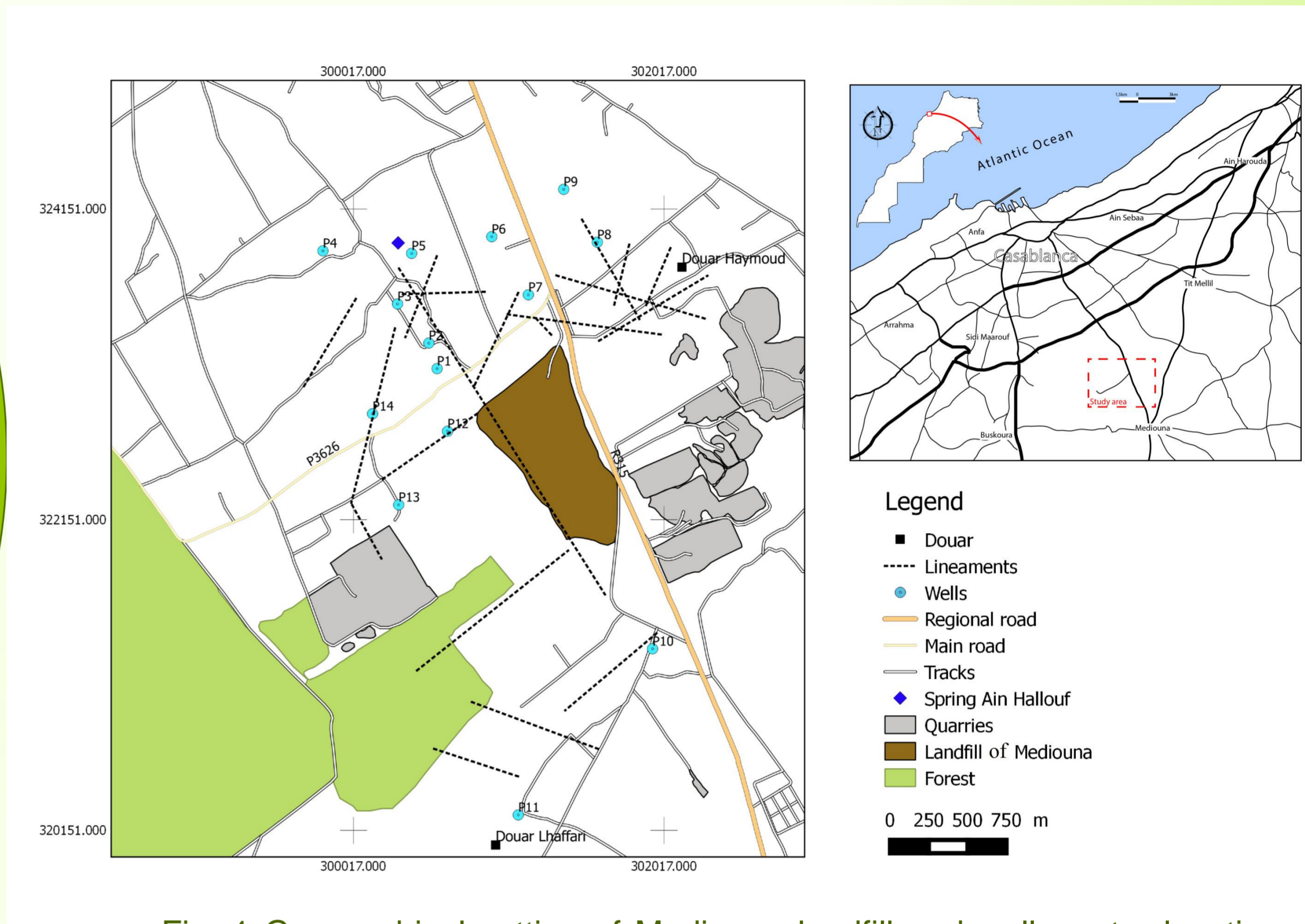
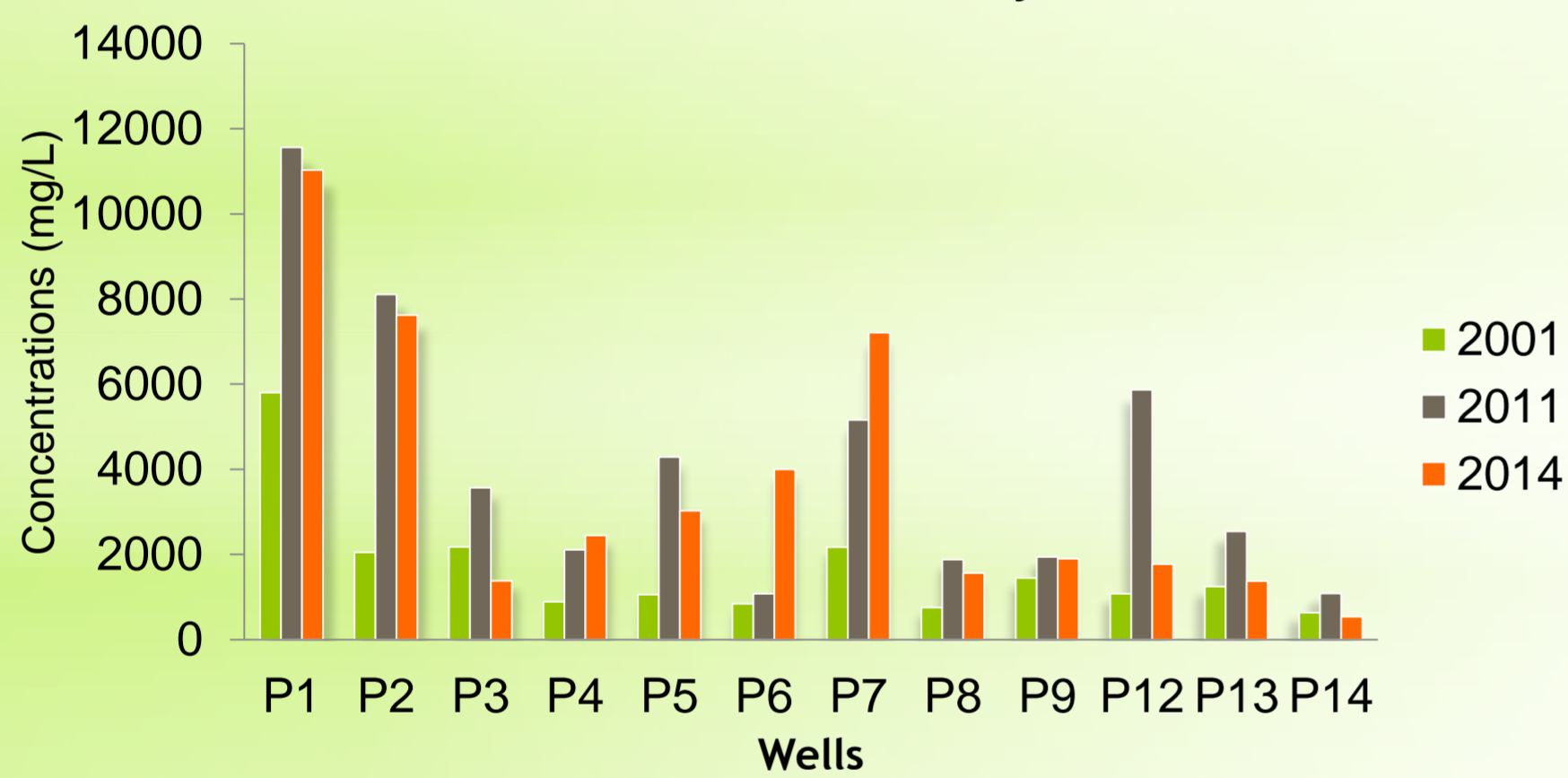


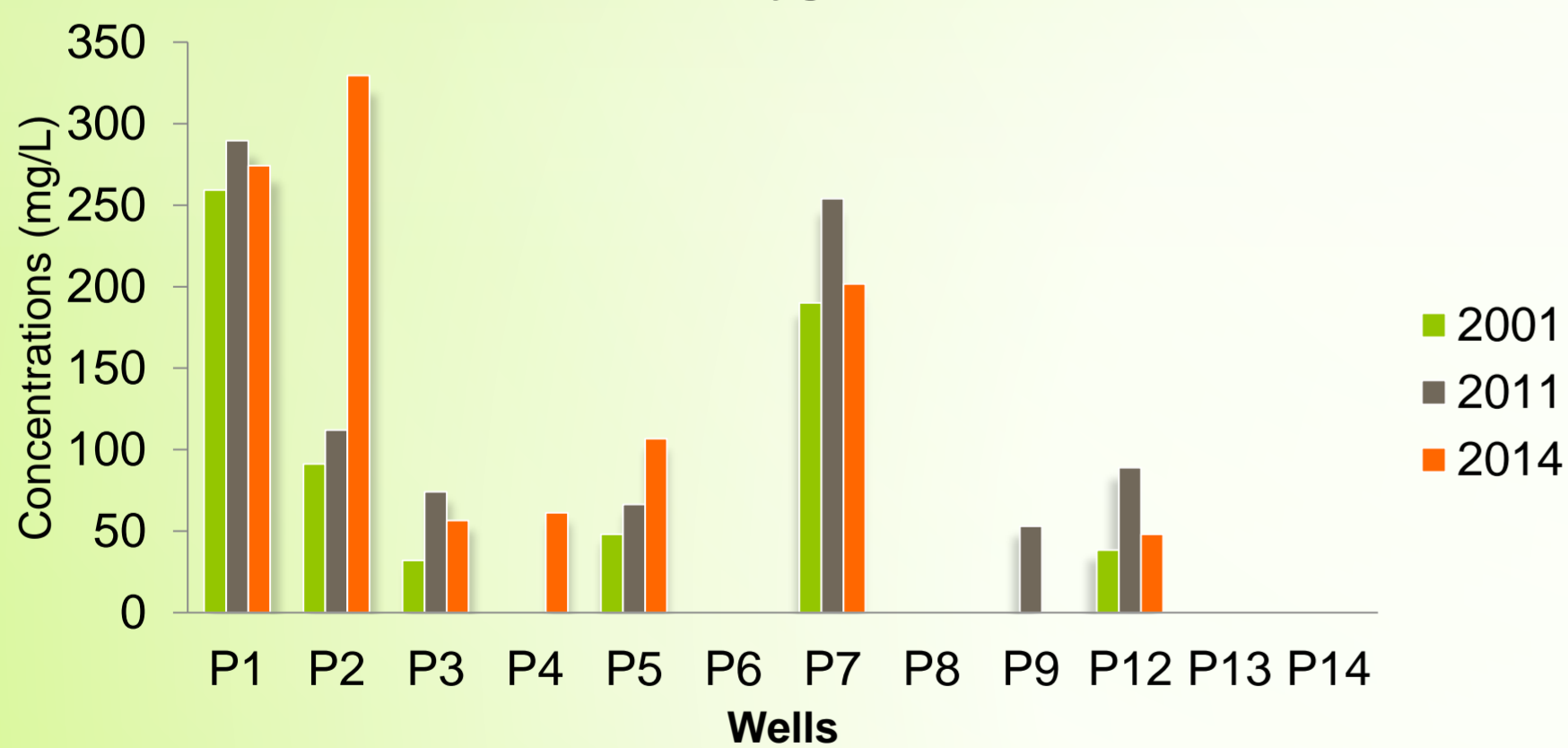
Fig. 1 Geographical setting of Mediouna landfill and wells water location down and up stream.

Electrical conductivity



Monitoring of mineralization

Chemical oxygen demand



Monitoring of organic matter

Methodology

Samples were analyzed for physic-chemical parameters: pH, electrical conductivity, COD and majors elements (Ca^{2+} , Mg^{2+} , SO_4^{2-} , NO_3^- , HCO_3^-) according to AFNOR standars.

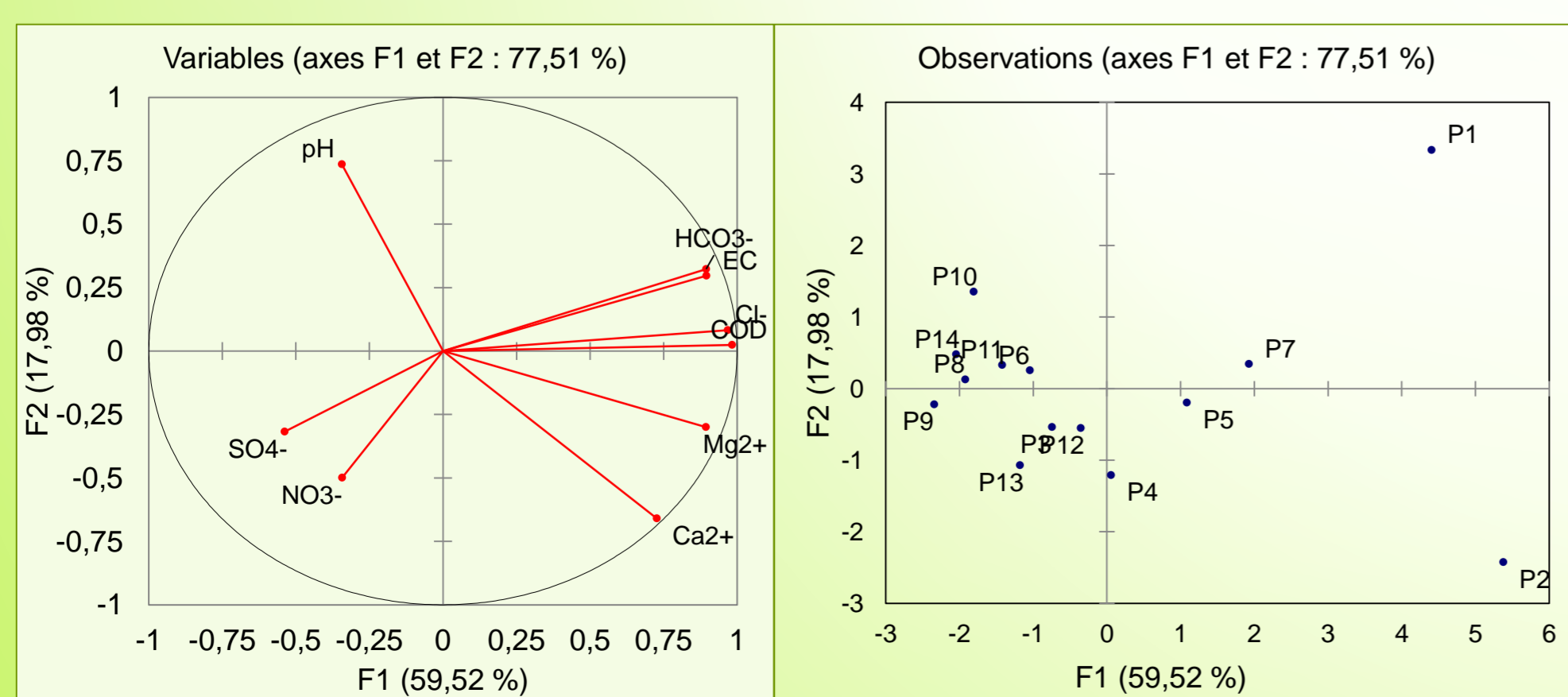
Results

Some results of Hydrochemical analysis shows that ; electrical conductivity which is the indicator of mineralization in water, has increasing concentrations from 2001 to 2014, related to leachate percolation by fractures and the dissolution of limestone. When, chemical oxygen demand as indicator of organic matter in water show increasing rate with appearance of organic matter in some wells, indicates spread of organic matter downstream landfill.

Principal components analysis of 2014 can distinguish three groups of wells water: the first one with high mineralization and high rate of organic matter. The second group intermediate show moderate concentrations, the last one show absence of organic matter and low mineralizations

Conclusion

Mediouna landfill constitue huge impact on groundwater quality and the extension of pollution plume in downstream increase by time towards Casablanca, materialized by fractures, which play a great role in leachate percolation.



Principal components analysis of chemical analysis and wells water