

# Updating the Algerian Solar Potential: Context, Issues and Provided Solutions

*Z. Bouzid*<sup>✉</sup>, *M. Debbab*, *M. Belaoui*, *N. Ghellai*

Material and Renewable Energy Research Unit, University of Tlemcen, Algeria

<sup>✉</sup>Corresponding author email: bzd.zakaria@gmail.com

## Abstract

The sharp increase experienced by oil prices in the 70s pushed man for the first time to be interested in alternative sources of energy. In Algeria, even if opinions differ when it comes to agree on a specific date, all experts in the field come together to say that it will come a day where the depletion of fossil resources will be inevitable [1].

One answer to concerns caused by this is the use of renewable energies. These sources, besides the fact that they respect nature, are also known to be inexhaustible for human timescale. In Algeria, in this field, the solar one is positioned in first position. In this context, we have decided in our work to contribute in the updating of solar potential of this country in order to identify where the installation of systems using this energy would be interesting.

**Keywords:** renewable energy, alternative sources, solar potential, Algeria

## Problematic:

The solar field can be defined as the amount of solar radiation received by a surface for a specified period. Many studies have been made to analyze and quantify the solar potential of Algeria, the most famous of these is surely the Solar Atlas of Algeria published by the Algerian office of university publications in 1987 [2]. In our work, to contribute to its updating, the radiation data are required. The easiest type of data to obtain is the global radiation on horizontal plane. Thus, the use of measurements from meteorological stations seems like an adequate solution. However, no database containing the necessary data is freely available, and even when it is, we encounter other problems:

- The number of covered regions is limited (especially in the Deep South).
- The number of data is limited.
- The format and time frequency does not always work out.

## Methodology:

Facing the challenges mentioned earlier, we have decided to:

- Find easily exploitable databases containing the necessary data for our work.
- Develop tools for recovering and process data thanks to a computer.
- Draw maps to assess and analyze the solar potential based on the geographical location.

Thanks to the research program in Earth Sciences at NASA, we were able to get daily horizontal solar radiation values. These values, derived from the web portal "Surface meteorology and Solar Energy" (SSE) [3], and covering several years, have been automatically retrieved and treated thanks to a script that we developed with the Bash language [4].

## Results:

Solar energy maps were drawn for each month of the year. In Figure 1, we present the maps of the 12 months.

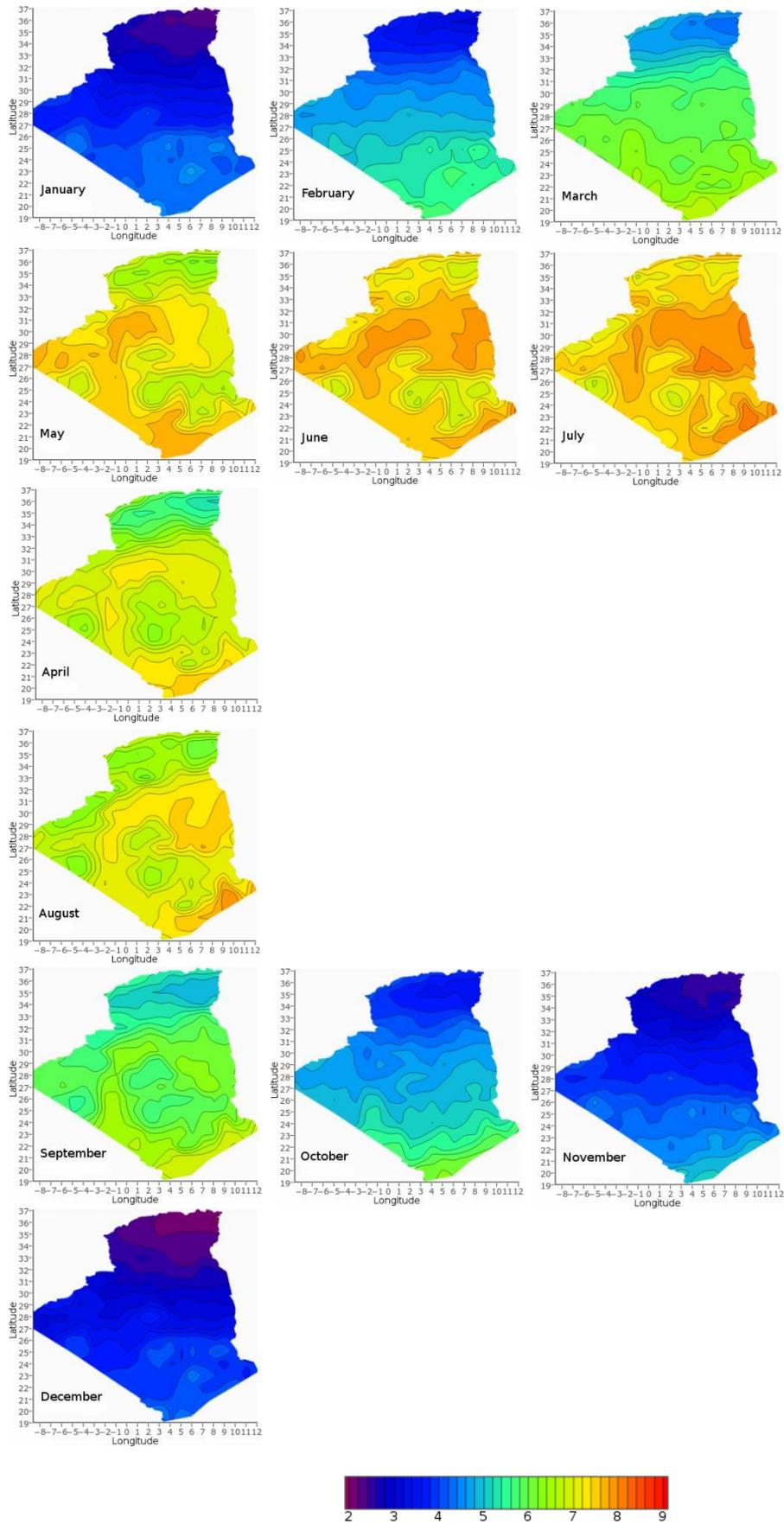


Figure 1. Algerian solar potential maps (kWh/m<sup>2</sup>/day)

Usually, the solar radiation throughout the country tends to increase from January to July

when it reached its maximum. From August, it begins to weaken until the end of the year. We also note that the solar energy is strongest in southern Algeria. More we head north, over the amount of this energy that can be detected by a receiver at ground level weakens.

### **References**

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