**Introduction.** Relative outside humidity is an important parameter which may affect recovering of the solar energy in a ratio to be estimated. During year periods, humidity varies in wide ranges. By using the data recorded in 2009, 2010 and 2011 on USAMV-CN observation point (the values on the first day of the months, at beginning of the hours), following surface levels were obtained for relative outside humidity:

![Figure 1: Three year average of month (1 to 12) - hour (0-24) relative humidity variation in a given location (USAMV-CN) ![Figure 1: Three year average of month (1 to 12) - hour (0-24) relative humidity variation in a given location (USAMV-CN)](image)

The variability of relative humidity during year and during day has a major impact on vegetation growing (Jamiyansharav & others, 2011) as well as on the recovery of the solar energy using different modern techniques for adsorption and storage of the thermal energy (Dicaire & Tezel, 2011). The research was aimed to obtain a mathematical model able to estimate and use which includes solar, temperature, humidity, wind and rain sensors and the data are recorded into a MySQL database at every minute by using a home-made client-server uploading software - first time reported in (Bălan & others, 2008) for monitoring of direct and total solar radiation system.

<table>
<thead>
<tr>
<th>Place</th>
<th>Weather station</th>
<th>GPS</th>
<th>Elevation</th>
<th>Distance from ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regin</td>
<td>st1</td>
<td>N 46° 46' 12.41&quot; E 24° 41' 27.99&quot;</td>
<td>390m</td>
<td>1.5m</td>
</tr>
<tr>
<td>USAMV-CN</td>
<td>st2</td>
<td>N 46° 45' 34.00&quot; E 23° 34' 20.53&quot;</td>
<td>381m</td>
<td>1.5m</td>
</tr>
<tr>
<td>UT-CN</td>
<td>st3</td>
<td>N 46° 47' 45.40&quot; E 24° 37' 34.33&quot;</td>
<td>326m</td>
<td>20m</td>
</tr>
</tbody>
</table>

"Vantage Pro2" Integrated Sensor Suit includes solar, temperature, humidity, wind and rain sensors and the data are recorded into a MySQL database at every minute by using a home-made client-server uploading software - first time reported in (Bălan & others, 2008) for monitoring of direct and total solar radiation system.

**Material.** By using the hour to hour data from one monitored location (st2 in Table 1) - a place in court yard of the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, analysis of the relative outside humidity were conducted. Due to several power fails breaking the communication between the weather station and its acquisition system only about 67% of the data were available and were included into the analysis (5872 records out of 8760).

**Method.** The analysis was conducted using StatSoft Statistica (v.8.0). The ARIMA models were found to be statistically significant in agreement with the observations and were further investigated in order to obtain the best agreement. The Statistica software provides various results graphs, forecasts, and tools for assessing the quality fit to the data using ARIMA models. ARIMA(p, d, q)(pS, dS, qS) are a model to fit a continuous variable (the relative humidity in our case):

- p: Number of nonseasonal autoregressive parameters;
- q: Number of nonseasonal moving average parameters;
- pS: Number of seasonal autoregressive parameters;
- qS: Number of seasonal moving average parameters;

**Results.** Auto-Regression Integrated Moving Average analysis revealed that a (2,0,1)(1,0,1) model with one intervention (abrupt & permanent, at case number 96) were able to explain over 98.5% of the total variance (see following table).

**Discussion.** Reporting our results with other similar results we can say that we are in a good agreement with the results of (Shiri & others, 2010). Thus, (Shiri & others, 2010) reported a (1,0,1)(1,1,1) ARIMA model when the data from 25 years were averaged monthly and were converted to a stationary series by differencing order 1.


