When adjusting radar data to raingauge measurements, both data sources should be reliable. The best results with data comparison can be obtained by experienced observers. However, in a real-time context and for long data periods, manual procedures may be prohibitive because of their required amount of time.

Three different methods to check raingauge and radar data have been compared:
- a visual data comparison based on qualified data screening
- a similar approach to the Automated Quality Check (AQC)
- an automatic time series shape comparison procedure (ATC)

The results of the three methods were evaluated on a day by day basis.

**Used data sets**
- 19 – 20 September 1999, Piedmont region, Italy
  Monte Lema radar (Switzerland); 70 raingauges
- 1 – 7 June 2001, Northrhine Westfalia, Germany
  Essen radar (Germany); 29 raingauge

**Conclusions**
- The procedures can be used for initial data quality check as well as for measuring the improvement of radar data after correction.
- Both automatic procedures deliver results similar to the visual comparison:

<table>
<thead>
<tr>
<th>Comparison (visual-AQC)</th>
<th>Comparison (visual-ATC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identical classification</td>
<td>110</td>
</tr>
<tr>
<td>One class difference</td>
<td>69</td>
</tr>
<tr>
<td>Two classes difference</td>
<td>5</td>
</tr>
<tr>
<td>No rainfall</td>
<td>94</td>
</tr>
<tr>
<td>No comparison possible</td>
<td>109</td>
</tr>
</tbody>
</table>

**Results of the two data sets**
- The detection of a bad similarity of the two series is useful for the indication of insufficient correction of radar or raingauge data or to disapprove the data for radar data adjustment.
- A combination of an investigation of the precipitation volume and the shape of the time series is necessary for a comprehensive sight on the data quality. Herefore the two investigated automatic methods deliver useful results.

**The Visual data comparison** is a subjective method. Relevant characteristics for the visual comparison are the agreement of the distribution of the precipitation intensities and the correlation of the precipitation peaks.

The **Automatic quality control (AQC) procedure** is based on an approach of Amitai (2000). It defines five indices, which characterize the similarity between two time series based on collocated radar and raingauge data. In the VOLTAIRE project, a version of the procedure has been implemented in the VOLTAIRE QC library (Golz et al., 2006).

Data series pairs considered to be good need to fulfill threshold conditions for all five indices.

The **Automatic time series comparison (ATC) procedure** is a semi-empirical method to compare two time series, based on the temporal distribution of their relative shape. Each time series is transformed into a relative time series by normalizing the data on the daily sum (Fig. 1).

Four attributes were checked, and three similarity conditions needed to be fulfilled to yield a good comparison result.

**For the comparison of the different methods three evaluation classes were used:**
- **Good** agreement (e.g. comparable intensity distribution, good agreement of the precipitation peaks)
- **Moderate** agreement between radar and raingauge
- **Bad** agreement (e.g. no agreement of the main precipitation peaks, different intensity distribution, no rainfall at one of the two time series, example in fig. 2)

The AQC and ATC methods are part of the SCOUT radar tools.

**References**