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Higher Data Quality by Online Data-Entry and Automated Plausibility Checks

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Long-term phenological observations are now recognized as important indicators for climate change impact studies. With the increased need for phenological data, there is also an increased need for higher data quality.
Since 1951 MeteoSwiss has been operating a national phenological observation network. Currently the network consists of about 150 active stations observing up to 69 different phenophases. An important aim of a running three years project at MeteoSwiss is a further increase of the quality of the collected data.
The higher data quality will be achieved by an automated procedure performing plausibility checks on the data and by online data-entry. Further measures such as intensified observer instructions and collection of more detailed metadata also contribute to a high data quality standard.
The plausibility checks include the natural order of the phenophases within a species and also between different species (with regard to possible natural deviation). Additionally it will be checked if the observed date differs by less than two standard deviations from the average for this phenophase at the altitude of the station. A value outside of these limits is not necessarily a false value, since occurrences of extreme values will be beyond these limits. Therefore, within this check of the limits, the timing of the season of the respective year will also be taken into account. In case of an implausible value a comparison with other stations of the same region and sea level is proposed. A further possibility of data quality control could be to model the different phenophases statistically and to use this model for estimating the likelihood of observed values. An overall exploratory data analysis is currently performed providing a solid basis to implement the best possible methods for the plausibility checks.
Important advantages of online data-entry are the near real-time availability of the data as well as the avoidance of various kinds of typical mistakes (month-lag, typing errors, etc.). The combination of online data-entry and automated plausibility checking makes it possible to contact the observer promptly in case of implausible data. Therefore a further aim is to create an easy tool for data-entry by PC, tablet or smartphone. A promising step in this direction is the internet platform PhaenoNet (a common platform of GLOBE Swiss, MeteoSwiss and the ETH Zurich). In 2013 already 25 % of the MeteoSwiss phenological observers used PhaenoNet.