



Evaluation and Stakeholder Needs Related to Experimental Services of Early Warning Information on Extreme Temperature Events in Japan

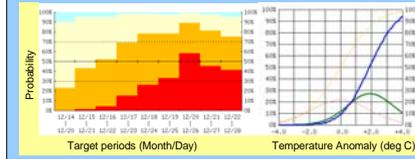


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Summary

- JMA has started the experimental provision of early warning information on extreme temperature events in March 2007.
- It is founded that heatstroke patients are exponentially increasing with 7-day averaged temperature. (Fig 3)
- The early warning information issued in July 2007 prevents the crops from failing. (Fig. 4)
- Hit rate of the forecasts is 57 %, and better performance is expected by the new guidance for operational use. (Table 1,2)
- We have got many comments from 27 agricultural and electric power institutions. And, they are very useful in future development.
- In March 2008, we will start operational issue to the public.

Availability of Probabilistic Products at JMA web page



Left figure shows forecasted probability projection. Right figure shows the forecasted Probability Density Function. Moreover, you can see cumulative probability of any threshold temperature. <http://www.jma.go.jp/en/longfcst/>

1. Background

- JMA has long history of conducting agrometeorological services since 1950s.
 - However, only conventional observation reports and general forecast information are provided.
 - In 2003, extreme cool summer hit Japan with serious damage and losses of crop production (\$4 billion).
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- Figure 1
- There are increasing needs for effective use of probabilistic forecast to mitigate climate-related damage on agricultural products.

2. Objective

- To mitigate the adverse impacts of the events on socio-economic activities in various sectors such as agriculture, electric power, health and disaster prevention.
- To facilitate the use of probabilistic information instead of category forecast.

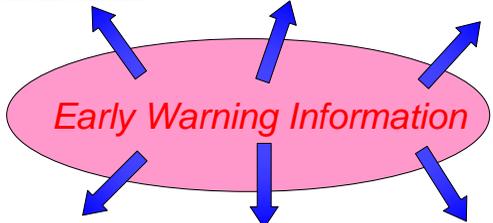
3. Outline of the Experimental Issue

- Targeted event
 - An extreme 7-day averaged temperature event with 10% probability of normal occurrence.
 - Targeted areas
 - 11 climatological divisions and 150+ stations over Japan.
 - Timing of issuing
 - When an extreme 7-day averaged temperature event is predicted within two weeks.
 - Contents of the early warning information
 - A brief description of expected weather situation and probabilistic forecast products.
 - External partners
 - Agricultural associations
 - Crop research institutes
 - Electric power companies
 - Feedbacks
 - The information will be reviewed and improved according to requirements and suggestions from the external partners.
 - Sample of early warning information
 - In Kanto region, for about one week starting on 2nd December, extremely low temperature, 2.3 degree C below normal, is predicted with 30 % probability of occurrence.
 - Please be cautious about managements of crops and health. Keep paying attention to subsequent weather information.
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- Figure 2. 11 climatological divisions

4. Effective Provisions Utilizing Early Warning Information

Many farmers need a week lead time for deep-water management of paddy field.

Agricultural service for fruit tree, vegetation, flowering plant and tea plantation.

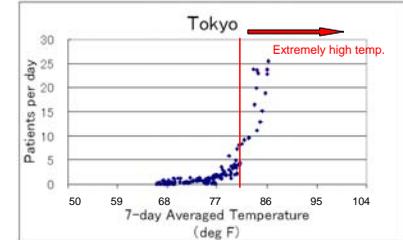


Making a supply schedule of electric power for next week.

To sprinkle water and blow over livestock in heat wave.

Heatstroke

Figure 3. The heatstroke patients are exponentially increasing with 7-day averaged temperature in Tokyo. If we can predict heat wave events in summer, then the early warning information may prevent the public from having heatstroke.



Referred from National Institute for Environmental Studies

5. What is Needed by Stakeholders

- Improvement in forecast skill, especially decreasing unpredicted extreme events.
 - Daily max/min temperature until 2 weeks onward for detailed planning electric power supplies.
 - Other elements such as precipitation, sunshine and humidity for management of crops.
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6. A Concrete Example of Utilizations: Prevention of Cold Weather Damage

We issued the early warning information for very low temperature event in July 2007.

Figure 4. JMA ensemble forecast.

The farmers could consider their plan in advance, because paddy rice tend to suffer cold weather damage in summer.

Figure 5. Cool summer hit Japan in July 2007.

7. Evaluation of Experimental Services

Figure 6. Verification in Hokkaido region in 2007.

Present Guidance			Developed New Guidance		
	Observation Yes	Observation No		Observation Yes	Observation No
Forecast Yes	75	56	Forecast Yes	133	124
Forecast No	214	627	Forecast No	156	559

Table 1. This table shows frequency of the issue and corresponding to observation. Hit rate of the forecasts is 57 %, still not enough to satisfy the desires of stakeholders. They complain about many occurrences of unpredicted extreme events.

Table 2. Similarly as table 1, this table shows performance on New Guidance. We have developed New Guidance using hindcast-based statistical method for operational use. And we expect better performance than the present.