Recent JMA's activities for climate related decision making

- Climate Risk Management in the Apparel Industry -

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Outline

- Introduction
  - Climate Risk Management for Apparel Industry
- Relationship between fashion items and weather factors
  - Some examples
- Use of a two-week forecast for apparel sectors
  - Some examples
  - Implementation of action plans
- Further activities
  - Awareness campaign for users
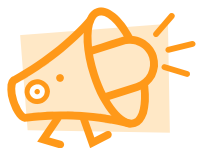 - Climate Risk Management for other sectors

Introduction

Background

The Japan Meteorological Agency (JMA) has been conducting a project to promote climate risk management **(CRM)**, which involves reducing weather risks caused by extreme events such as heat waves or cold spells, in various sectors using extended-range weather forecasting, especially using the "Early Warning Information on Extreme Weather"(a two-week forecast).

EWIEW

Early Warning Information on Extreme Weather

Pilot Project

Development of an early warning System for agriculture

Joint Research

Collaborative research with private sectors in apparel industry

*From 2008* ⟶ *From 2010* ⟶ ***From 2012***

Collaborative research with apparel sector

Research in the Apparel Industry

We JMA investigated the relationship between fashion items and weather factors, especially temperature. Additionally, we investigated how to use the two-week forecast for sales promotion to get more benefit.

(Special thanks for "Japan Apparel Fashion Industry Council" and "Life & Business Weather, Inc")
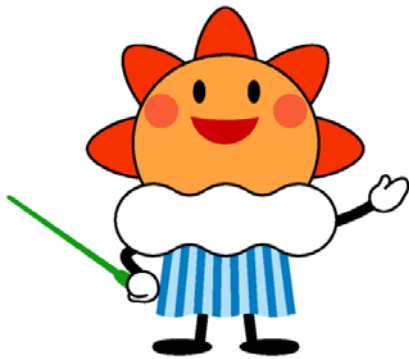
Provider

JMA

Japan Meteorological Agency

Collaboration!

JAFIC
JAPAN APPAREL·FASHION
INDUSTRY COUNCIL

Users

JAFIC

Japan Apparel-Fashion Industry Council

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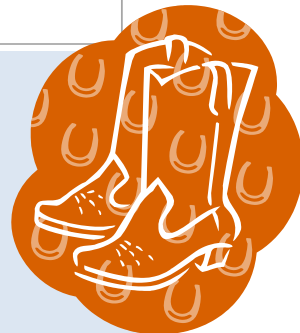 - Climate Risk Management for other sectors

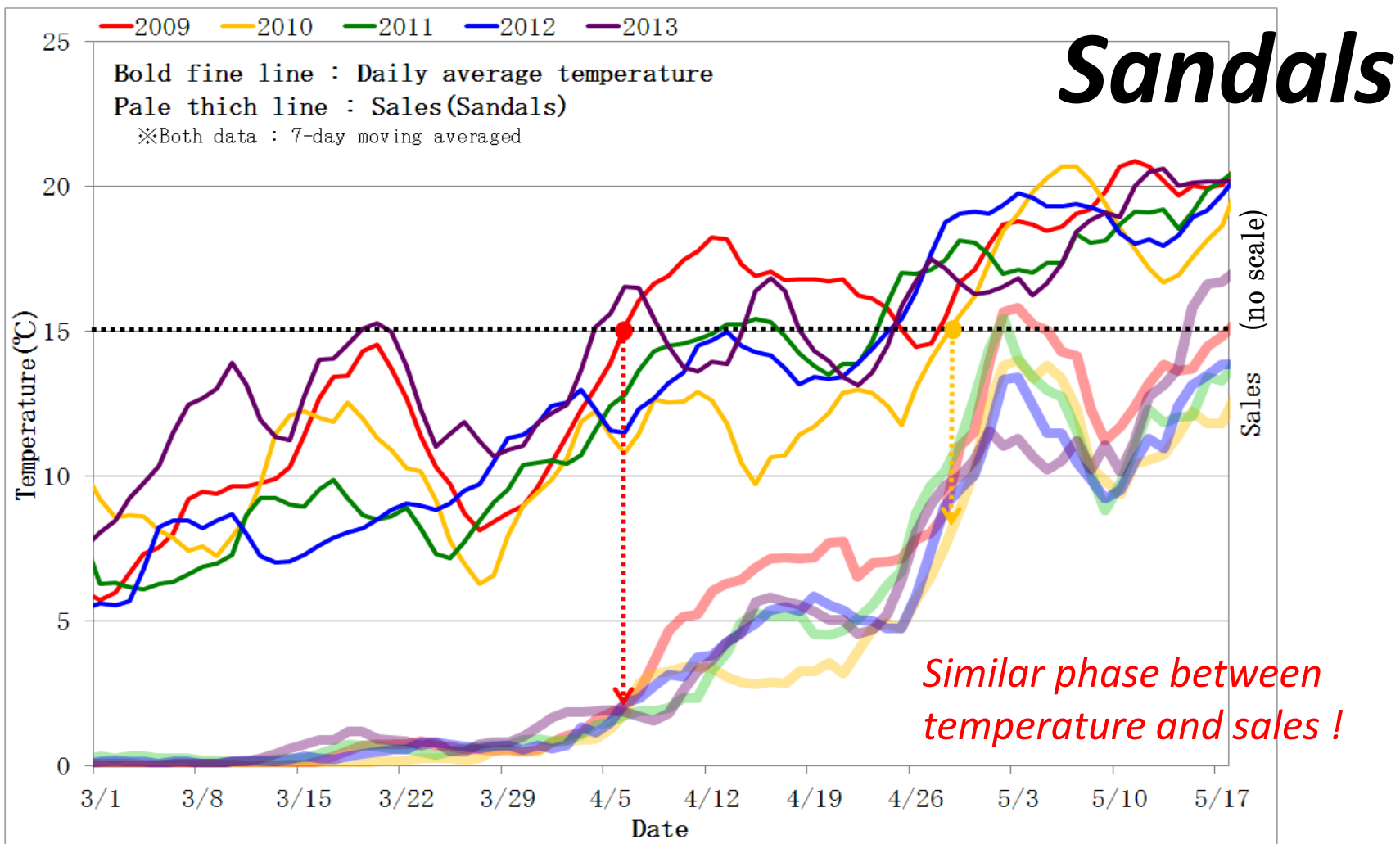# Relationship between fashion items and temperature
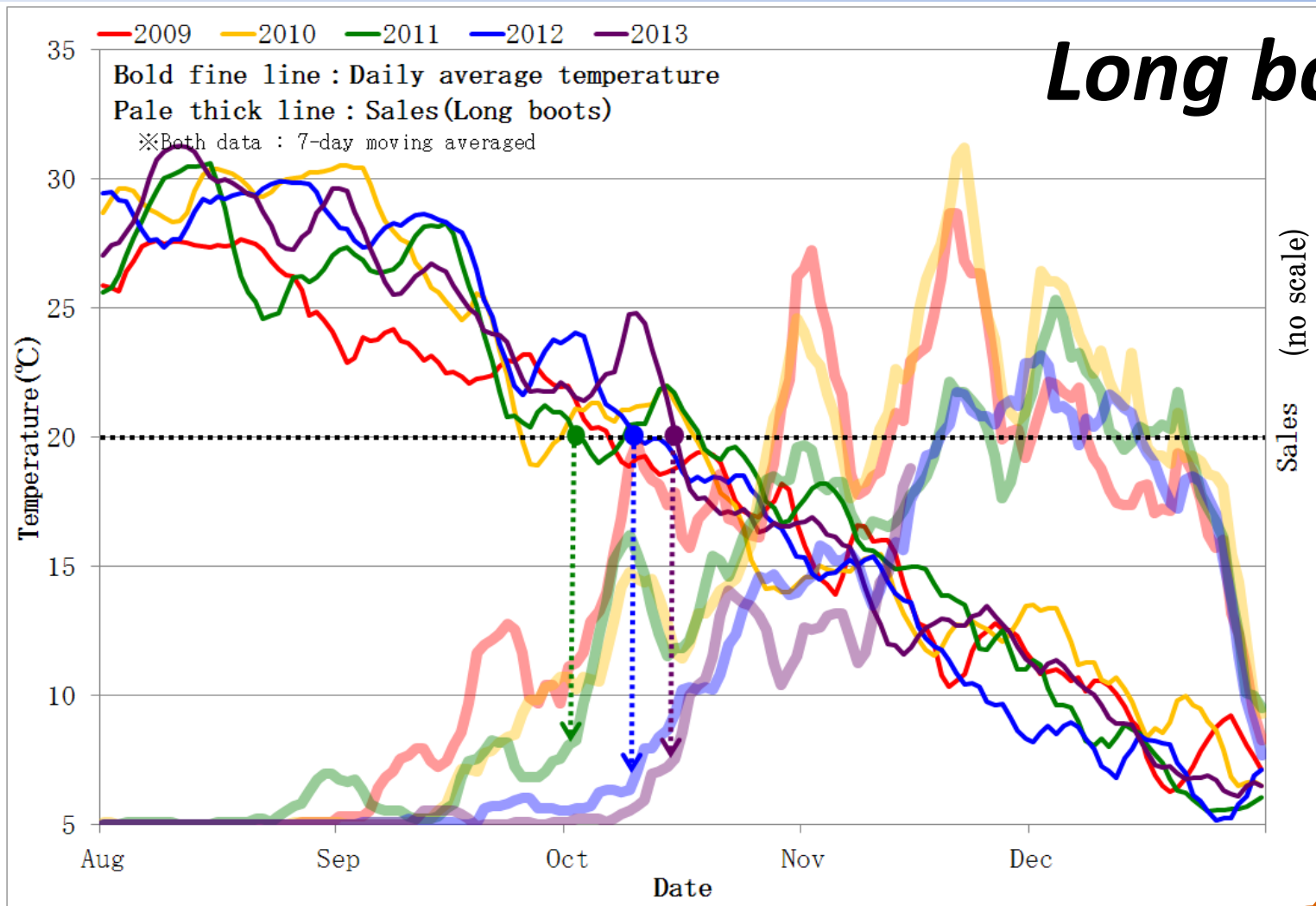
Long boots

Time series of the sales volume* of long boots and average temperature

- Sales volume of long boots: Tokyo metropolitan area
- Temperature：Tokyo
- * Sales volume tends to increase around 20 degC.

# Relationship between fashion items and temperature

Sandals

We investigated the relationship between sales of sandals and temperature. The target period was from March to May, when temperature rises.

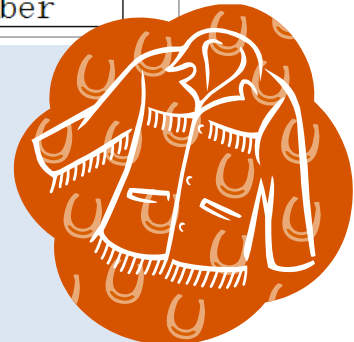- Sales volume of sandals: Tokyo metropolitan area
- Temperature：Tokyo

* Sales volume tends to increase around 15 degC.

Relationship between fashion items and temperature
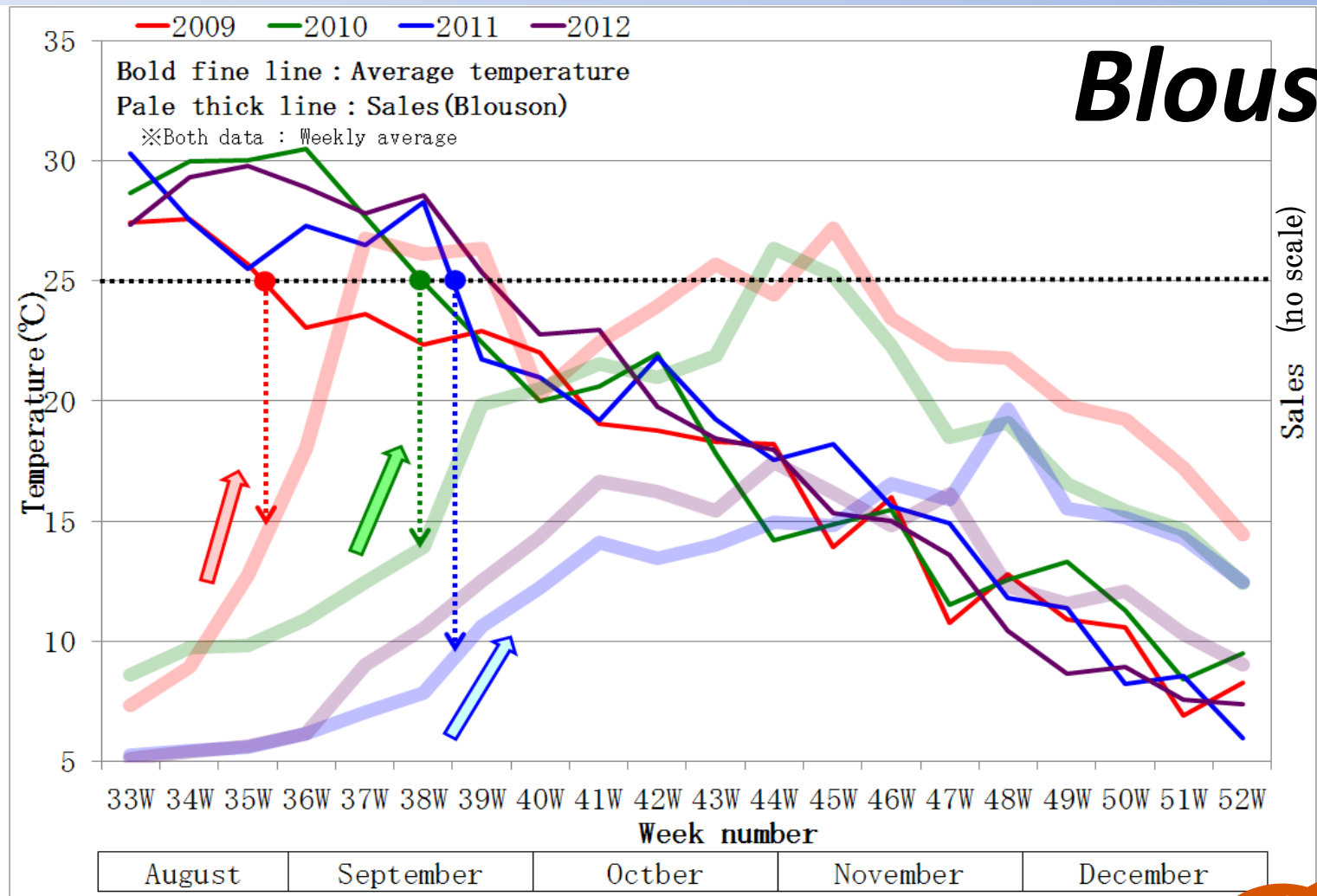
Blouson

- Weekly sales volume of blouson in stores around the Tokyo metropolitan area
- Temperature： Weekly average temperature (Tokyo)
- The weekly data is summarized from Monday to Sunday.

* Sales volume tends to increase around 25 degC.

Relationship between fashion items and temperature

Coats

Bold fine line : Average temperature
Pale thick line : Sales(Coat for women)
※Both data : Weekly averaged

- Weekly sales volume of coats for women in stores around the Tokyo metropolitan area
- Temperature：Tokyo
- Weekly average temperature (Tokyo)

* Sales volume tends to increase around 18 degC.
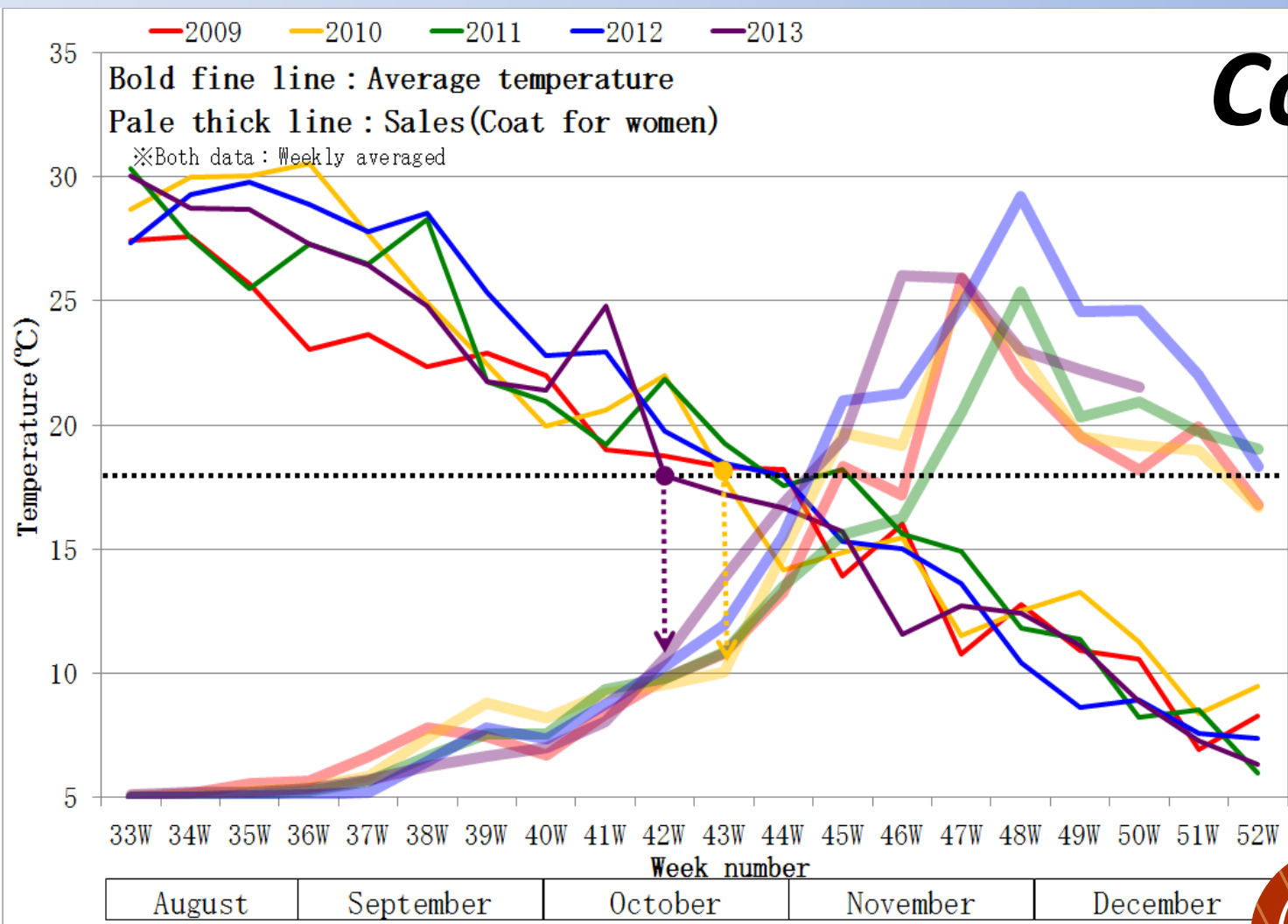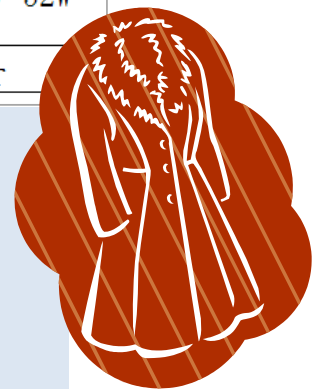
Relationship between fashion items and temperature

Threshold temperature for items

Item	Threshold temperature
Sandals	15°C↑
Knit items for women	27°C↓
Blouson	25°C↓
Long boots	20°C↓
Innerwear tops for autumn and winter	20°C↓,15°C↓
Coats for women	18-19°C↓
Knit hats	15°C↓

↓ = Sales increase when the temperature falls below the threshold.
↑ = Sales increase when the temperature rises above the threshold.

This results is especially comes from our research case (at Tokyo). Another analysis will be needed for each own cases .

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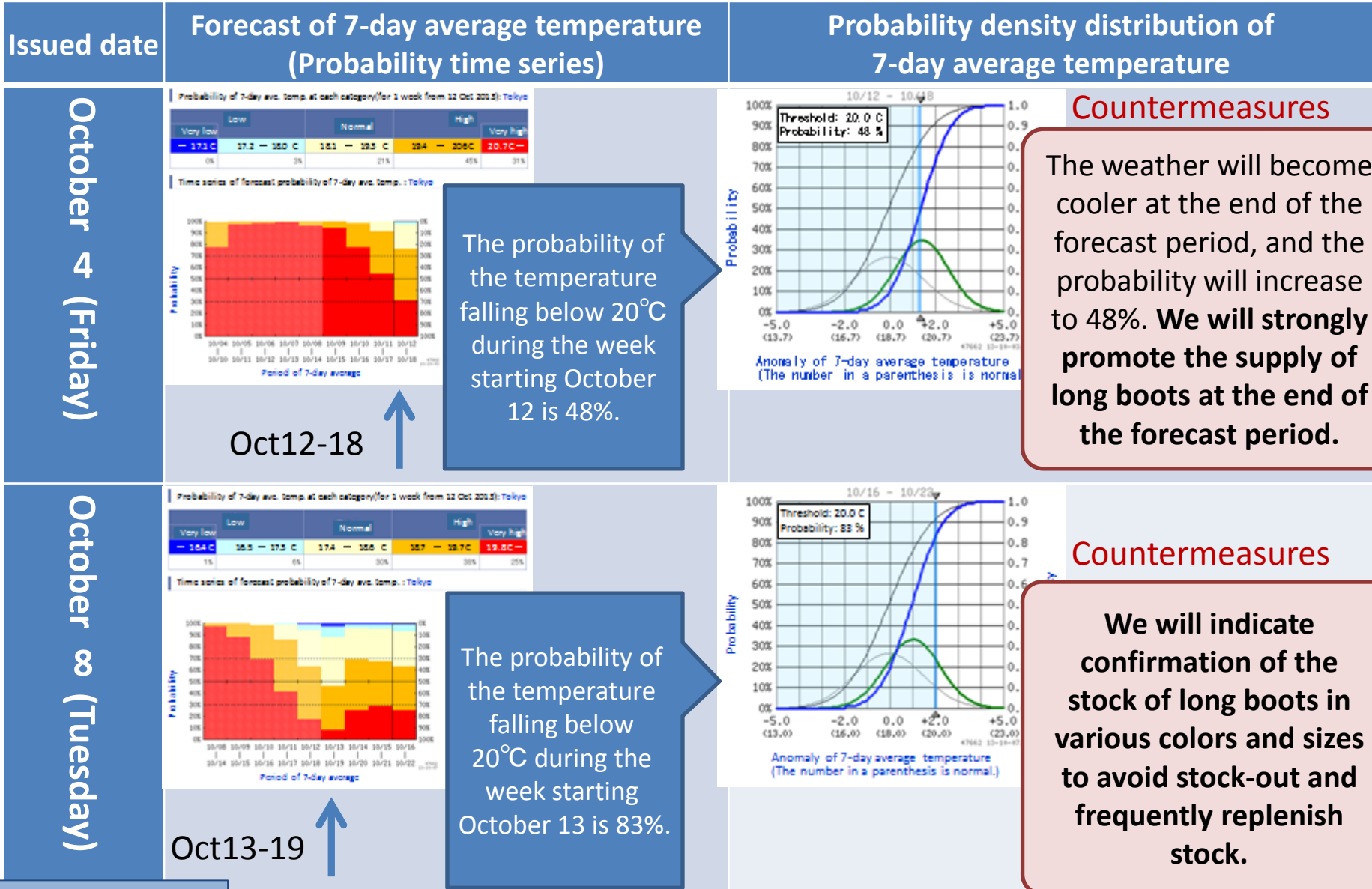 - Climate Risk Management for Apparel Industry
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Use of a two-week forecast for CRM

An apparel companie tried to hedge weather risks by using a two-week forecast.

Long boots **20°C↓**

Issued date	Forecast of 7-day average temperature (Probability time series)	Probability density distribution of 7-day average temperature

October 4 (Friday)

Oct12-18

The probability of the temperature falling below 20°C during the week starting October 12 is 48%.

Countermeasures

The weather will become cooler at the end of the forecast period, and the probability will increase to 48%. **We will strongly promote the supply of long boots at the end of the forecast period.**

October 8 (Tuesday)

Oct13-19

The probability of the temperature falling below 20°C during the week starting October 13 is 83%.

Countermeasures

We will indicate confirmation of the stock of long boots in various colors and sizes to avoid stock-out and frequently replenish stock.

Target place is Tokyo

Implemented action plans for CRM

On the basis of results and discussions with Apparel companies, the following action plans for sales promotion might be implemented:

○Deciding a proper time for increasing/decreasing the number of each item
   For example, for late summer heat, we will keep items suitable for high temperature (replace cut-and-sew dresses and pants with blouson).
○Modifying the supply volume from warehouses to stores
   For example, when temperature is forecasted to exceed the threshold, we will increase the number of colors and sizes of sandals to prevent stock-out.
○Strengthening visual merchandising (VMD) such as point of purchase(POP)
   For example, if we expect knit hats sales to increase, we will move knit hats to the aisle space (eye-catching area for customers).
○Preparing a sales talk for customers
   For example, when temperature is forecasted to fall to the threshold, where innerwear is required, store assistants will ask customers to prepare for cold weather with innerwear.
○Arranging a sales floor plan
   For example,   if the late summer heat continues and knit hat sales do not increase, we will keep cut-and-sew items suitable for high temperature.

Strategies for the future

- We now provide 2-week forecast as average temperature, but it is not easy for general person(like sales clerks) to understand intuitionally, so forecasting for the maximum or minimum temperature would be preferable.

- Each area possibly has a different threshold temperature, so we should collect more precise data at each area and develop an analysis.

- Considering errors in forecasts, we should prepare a guideline on how to use probability forecasting (for example, action plans according to rank).

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Further activities for spreading CRM in the apparel Industry

Seminar

Seminars of how to use climate information for CRM

Public relations field

Exhibitions of events for business solution

CRM Activities for other sectors

- We JMA now planning to research CRM in other sectors of Industries which is highly affected by weather and climate.

  (for example drugstore, department store, and so on.)

- In the Agricultural sectors, JMA is conducting new joint researches with agricultural research centers all over Japan.

We are planning to release the cultivation management systems for whole regions in Japan, to stably supply farm products.

Hokkaido
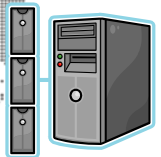Beating potatoes harmful for field condition using cold temperature

Tohoku
2-weeks ahead Temperature prediction for rice crops .etc

Kanto (Central)
Making data set of weather information for agriculture .etc

Kinki-Chugoku-Shikoku
Prediction of Red mold disease of wheat

Kyushu-Okinawa
Prediction of High-Temperature Damage to Rice Grain
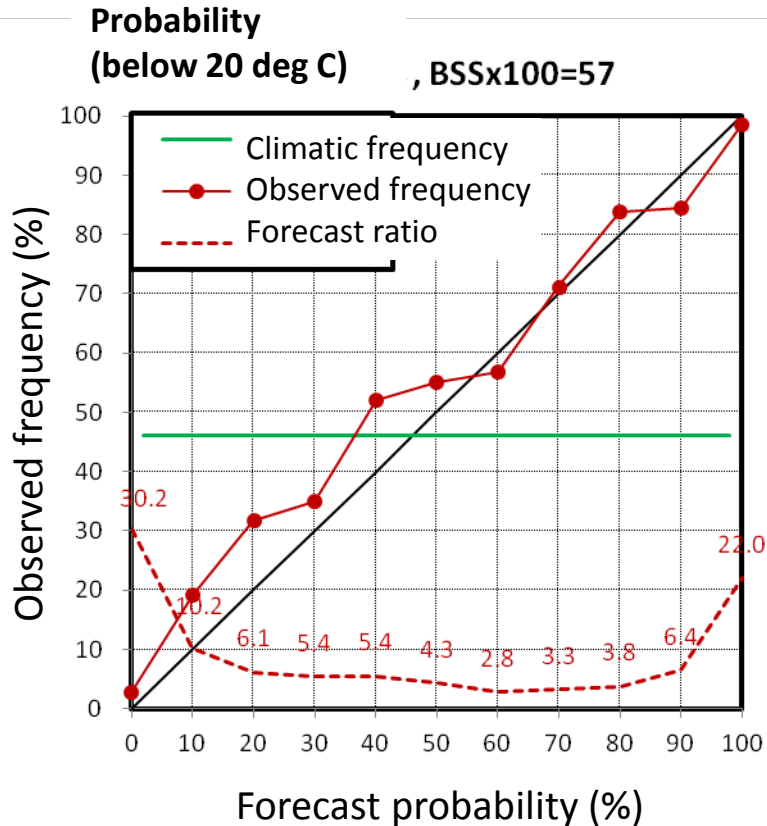
Thank You !!

HARERUN : A mascot of JMA

Backup Slides

Forecast's Reliability

- Reliability diagram from Hindcast of past 30 years(1981 to 2010)
- 2weeks Ahead forecast of points in Kanto Region(around Tokyo)
- Probability of below xx deg C (7-days average temperature)

Probability (below 20 deg C) , BSSx100=57

・Target : forecasts of Date in September
・N=1800

Probability (below 15 deg C) , BSSx100=74.6
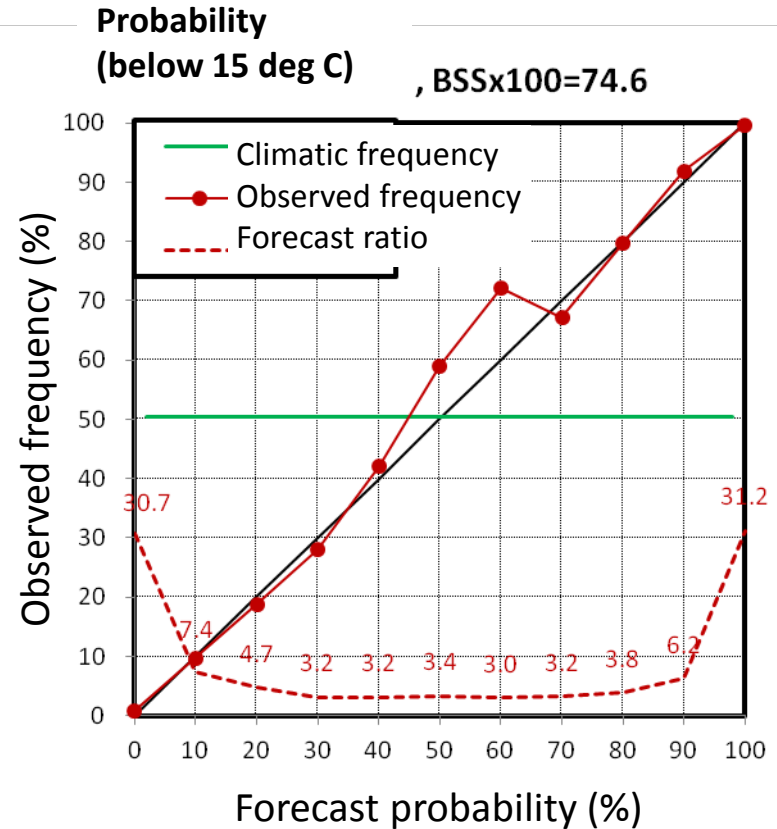
・Target : forecasts of Date in October
・N=1800