

FAQ on Cold Wave

Q. What is Cold wave?

Qualitatively, cold wave is a condition of air temperature which becomes fatal to human body when exposed. Quantitatively, it is defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal.

India suffers from severe winter and associated cold wave because of very low minimum temperatures. Cold wave impact gets aggravated due to wind speed which is termed as wind chill effect. Some parts of northern India and also parts of central India generally affected by cold wave condition during winter season.

Q. What is criterion for declaring cold wave?

Cold Wave is considered when minimum temperature of a station drops to 10°C or less for plains and 0°C or less for Hilly regions.

a) Based on Departure from Normal:

Cold Wave: Departure from normal is -4.5°C to -6.4°C

Severe Cold Wave: Departure from normal is -6.4°C or less.

b) Based on Actual Minimum Temperature (For plain stations only)

Cold Wave: When actual minimum temperature is $\leq 04^{\circ}\text{C}$

Severe Cold Wave: When actual minimum temperature is $\leq 02^{\circ}\text{C}$

If above criteria met at least in 2 stations in a Meteorological sub-division for at least two consecutive days and it declared on the second day.

Q. What is a criterion for describing *cold wave* for coastal stations?

When minimum temperature departure is -4.5°C or less from normal, "Cold Wave" may be described if the actual minimum temperature is 15°C or less.

Q. What is Cold Day?

It should be considered when actual minimum temperature is 10°C or less for plains and 0°C or less for Hilly regions. It is defined based on departures of actual maximum temperature from the normal as given below: -

a) **Cold day:** actual Maximum Temperature Departure from normal is -4.5°C to -6.4°C .

b) **Severe Cold day:** actual Maximum Temperature Departure from normal is $< -6.4^{\circ}\text{C}$.

Cold day/cold wave should be described, if conditions are satisfied simultaneously.

Q. How to check Cold wave levels?

India Meteorological Department provides color-coded Cold Wave warning information through its daily bulletins as well as through a GIS-based visualization platform for the next 5 days. The same can be seen at www.mausam.imd.gov.in—→**Cold Wave Guidance**.

Q. Will I be affected by the Cold wave?

You may be affected if the cold wave forecast map shows a cold wave warning over your region or regions close to you. In this scenario, all precautions to mitigate the impact of cold waves should be undertaken and prompt medical service to be availed in case of any discomfort.

Q. What to do to before cold wave forecast is issued for my region?

- Listen to the radio, watch TV, read newspapers for local weather forecast to know if a cold wave is round the corner.
- Stock adequate winter clothing. Multiple layers of clothing are more helpful.
- Keep emergency supplies ready.
- An increased likelihood of various illnesses like flu, running/ stuffy nose or nosebleed, which usually set in or get aggravated due to prolonged exposure to cold. Consult the doctor for symptoms like these.

(Source: <https://ndma.gov.in/sites/default/files/PDF/Guidelines/Guidelines-on-Cold-Wave-and-Frost.pdf>)

Q. What are cold wave related disorders: symptoms and first aid for human beings?

Disorder	Symptoms	Prevention	First Aid/Treatment
HYPOTHERMIA: Defined as a lowered core body temperature usually below 34.4 degree C.(94 degree F.)			
1. Mild Hypothermia (90 degree to 95 degree F.) 2. Moderate Hypothermia: (82 degree to 89 degree F.) 3. Severe Hypothermia (less than 82 degree F.)	<ul style="list-style-type: none"> Shivering Dizzy, drowsy Irritability Confusion Slowed, slurred speech Altered vision 	<ul style="list-style-type: none"> Avoid exposure to cold. Eat properly & often. Warm liquids & water. Wear uniform/clothes properly & preferably in layers. Wear cap and socks. Keep active. Use warming tents. Get plenty of rest. 	<ul style="list-style-type: none"> Remove wet clothing. Warm the centre of their body first followed by chest, neck, head and groin region using an electric blanket if available. Use skin to skin contact under loose, dry layers of blankets, clothing, towels, or sheets Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not give fluids orally if the person is unconscious. After their body temperature has increased keep the victim dry and wrapped in a warm blanket including the head and neck. If victim has no pulse, begin Cardiopulmonary Resuscitation (CPR).
FROSTBITE: Frostbite is freezing of body tissue often accompanied with hypothermia. When ice crystal form between the cells of the skin and grow by extracting fluid from the cells, the circulation is obstructed, causing additional damage to the tissue affected. It commonly affects hands, feet, ears, nose and cheeks.			
Frostbite	<ul style="list-style-type: none"> Initially manifests as redness in light coloured skin or greyish in dark coloured skin. Tingling, stinging sensation. Turns numb, yellowish, waxy or grey color. Exposed body parts feel cold, stiff and woody 	<ul style="list-style-type: none"> Wear uniform/ clothes properly and in layers. Keep socks, gloves and clothing dry. Protect yourself from wind-chill. Drink hot fluids and eat often. Insulate yourself from the ground. Prevent skin contact with super cooled metal or fuel. 	<ul style="list-style-type: none"> Get into a warm room as soon as possible. Unless absolutely necessary do not walk on frostbitten feet or toes as this increases the damage. Immerse the affected area in warm but not hot water (the temperature should be comfortable for unaffected parts of the body). Ask an unaffected person to test the water temperature as patient may not be able to feel correct
		<ul style="list-style-type: none"> Seek medical aid for suspected cases. 	<ul style="list-style-type: none"> temperature due to numbness of body part and end up getting burnt. Warm the affected area using body heat; for example, the heat of an armpit can be used to warm frostbitten fingers. Do not rub or massage the frostbitten area; doing so may cause more damage. Do not use a heating pad, heat lamp or the heat of a stove, fireplace, or radiator for warming. Affected areas are usually numb and can be easily burnt.
CHILBLAINS: Caused due to exposure to cold, wet and humid conditions (between 32-60 degree F). Repeated, prolonged exposure of bare skin lead to development, only in a few hours. Ears, Nose, Cheeks, Fingers and toes are most commonly affected.			
Chilblains	<ul style="list-style-type: none"> Skin is initially pale and colourless. Worsens to achy, prickly sensation followed by numbness. Red, swollen, hot, itchy, tender skin upon rewarming. Blistering in severe cases 	<ul style="list-style-type: none"> Keep dry and warm. Cover exposed skin. Wear uniform/clothes properly. High risk during wet weather, in wet areas or sweat accumulated in boots or gloves. 	<ul style="list-style-type: none"> Prevent further exposure Avoid scratching Slowly warm the skin, Don't massage or rub Use corticosteroid creams to relieve itching and swelling Dry sterile dressing Keep blisters and ulcers clean and covered Seek medical aid
DEHYDRATION: Loss of body fluids to the point of slowing or preventing normal body functions. Dehydration increases chance of becoming a cold weather casualty.			
Dehydration	<ul style="list-style-type: none"> Dark urine Headache, Dizziness, nausea and Weakness Dry mouth, tongue, throat, lips Lack of appetite Irritability Stomach cramps or vomiting Increased or rapid heartbeat 	<ul style="list-style-type: none"> Monitor urine color Do not wait until you are thirsty Drink hot liquids for warmth 	<ul style="list-style-type: none"> Drink water or other warm liquids Avoid caffeinated liquids Do not eat snow Rest

CARBONMONOXIDE POISING (CMP): Carbon monoxide is a colourless, odourless, tasteless gas resulting from incomplete combustion of fuel from engines, stoves, heaters etc. In conditions of inadequate ventilation such as falling asleep in a motor with running engine in a closed garage inhalation of excessive amount of carbon monoxide may lead to poisoning.			
CMP	<ul style="list-style-type: none"> • Headache • Dizziness • Weakness • Ringing in ears • Nausea • Drowsiness • Bright red lips, eyelids 	<ul style="list-style-type: none"> • Ensure proper ventilation. • Turn heaters off when not needed. • Never sleep in vehicle with engine running. • Ensure heaters are regularly serviced. 	<ul style="list-style-type: none"> • Move to fresh air immediately. • Provide mouth- to-mouth resuscitation if victim is not breathing. • Seek medical aid promptly.
SNOW BLINDNESS: Inflammation and sensitivity of the eyes caused by ultraviolet rays of the sun reflected by the snow or ice.			
SNOW BLINDNESS	<ul style="list-style-type: none"> • Gritty feeling in eyes. • Redness and tearing. • Eye movement will cause pain. • Headache. 	<ul style="list-style-type: none"> • Eye protection. • Dark UV protective glasses. • Do not wait for discomfort to begin. 	<ul style="list-style-type: none"> • Remove from direct sunlight. • Blindfold both eyes or cover with cool, wet bandages. • Recovery may take 2-3 days.
TRENCH FOOT: A painful condition of the feet caused by prolonged immersion in cold water or mud and marked by blackening and death of surface tissue.			
TRENCH FOOT	<ul style="list-style-type: none"> • Reddening of skin. • Numbness, leg cramps, swelling. • Tingling pain, Blisters or ulcers, bleeding under the skin, gangrene(the foot may turn dark purple, blue or grey). 	<ul style="list-style-type: none"> • Thoroughly clean and dry your feet. • Put on clean, dry socks daily. 	<ul style="list-style-type: none"> • Remove shoes/boots and wet socks. • Dry their feet • Avoid walking on feet, as this may cause tissue damage. • Treat the affected part by applying warm packs or soaking in warm water (102° to 110° F) for approximately 5 minutes. • Obtain medical assistance as soon as possible.

(Source: <https://ndma.gov.in/sites/default/files/PDF/Guidelines/Guidelines-on-Cold-Wave-and-Frost.pdf>)

Q. What is the impact of cold wave on agriculture and what actions to take to counter it?

Cold wave and frost damages crops by causing illnesses including diseases of black rust, white rust, late blight etc. Cold wave also causes a variety of physiological disruptions in germination, growth, flowering, yield and storage life. The following actions are recommended.

- Undertake curative measures for cold illness/injury like spray with Bordeaux mixture or Copper Oxi-chloride, phosphorus (P) and potassium (K) to activate better root growth.
- Do light and frequent surface irrigations (high specific heat of water) during the cold wave wherever it is possible.
- Sprinkler irrigation (condensation-release heat into surrounding).
- Cultivate cold/frost resistant plants/crops/varieties.
- Use intercropping farming in horticulture and orchards.

- Mixed cropping of vegetables, viz., tomato, brinjal with a tall crop like mustard / pigeon pea will provide necessary shelter against cold winds (shelter against cold).
- Increase radiation absorption and provide warmer thermal regime through covering of nursery and young fruit plants during winter by plastic or by making thatches (jhuggies) of straw or sarkanda grass etc.
- Organic mulching (for thermal insulation).
- Planting of wind breaks/shelter belts (to reduce wind speed).

(Source: <https://ndma.gov.in/sites/default/files/PDF/Guidelines/Guidelines-on-Cold-Wave-and-Frost.pdf>)

Q. What is the impact of cold wave on livestock and what are dos and don'ts for such a situation?

During Cold waves animals and livestock require more food for sustenance as the energy requirement goes up. Extreme variations in temperature may affect the fertility rate in animals during the optimum breeding season for buffaloes /cattle. The following do's and don'ts are recommended for such situations.

Do's

- Cover the animal habitat from all sides during night in order to avoid direct exposure of animals to cold winds.
- Cover the animals, especially smaller ones, during cold days.
- Protect livestock and poultry from cold weather by keeping them inside.
- Improving livestock feeding practice and dietary additives.
- Use of high-quality forage or pastures.
- Provide fat supplements - concentrate ratio on feed intake, feeding, and chewing behaviour.
- Construction of climate smart sheds which allow maximum sunlight during winters and low radiation during summers.
- Selecting animal breeds especially fit for these conditions.
- Apply some bedding materials such as dry straw under animals during winters.

Don'ts

- Do not leave animals tied/roam in open area during cold wave
- Avoid animal fares (pashumela) during cold wave
- Avoid giving cold feed and cold water to the animals

- Avoid dampness and smoke in animal shelter
- Do not keep the animals in open during night and cold hours
- Carcasses of dead animals should not be discarded on the regular grazing routes of the animals.

(Source: <https://ndma.gov.in/sites/default/files/PDF/Guidelines/Guidelines-on-Cold-Wave-and-Frost.pdf>)

Q. What is the impact of cold wave on transport and actions suggested?

For the regions experiencing Cold Wave, airports, highways and railway routes may get affected and traffic on these routes may get disrupted due to low visibility. The road journeys may become difficult and the journey times also gets slowed down and sometimes may lead to traffic collisions. To cope up with the impact of cold waves the person should be careful while driving or outing through any transport. Fog light are to be used during driving. Passengers should be in touch with Airlines, Railways and state transport to be get update on the schedule of their journey.

Q. What to do to during cold wave forecast is issued for my region?

- Follow weather information and emergency procedure information closely and act as advised.
 - Stay indoors as much as possible and minimize travel to prevent exposure to cold wind.
 - Wear multiple layers of loose fitting, lightweight, windproof warm woollen clothing rather than one layer of heavy clothing. Tight clothing reduces blood circulation.
 - Keep yourself dry. If wet, then cover your head, neck, hands and toes adequately as the majority of heat loss occurs through these body parts.
 - Prefer mittens over gloves. Mittens provide more warmth and insulation from cold, as fingers share their warmth and expose less surface area to the cold.
 - Use hats and mufflers to prevent heat loss, Wear insulated / waterproof shoes.
 - Eat healthy food to maintain the equilibrium of body temperature
 - Eat fruits and vegetables rich in Vitamin-C to maintain adequate immunity.
 - Drink hot fluids regularly, as this will maintain body heat to fight cold.
 - Moisture your skin regularly with oil, petroleum jelly or body cream

- Take care of elderly people and children and check on neighbors who live alone, especially the elderly about their well-being.
- Store essential supply as per requirement. Store adequate water as pipes may freeze.
- Follow the guide on heat insulation for non-industrial buildings and take necessary preparedness measures.
- Watch out for symptoms of frostbite like numbness, white or pale appearance on fingers, toes, earlobes and the tip of the nose, while exposed to cold waves.
- Prolonged exposure to cold can turn skin to pale, hard and numb, and black blisters on exposed body parts such as fingers, toes, nose and/ or earlobes. Immediately consult the Doctor.
- Treat the areas affected by frostbite in warm (not hot) water (the temperature should be comfortable to touch for unaffected parts of the body).
- Do not ignore shivering. It is an important first sign that the body is losing heat and is a signal to quickly return indoors.
- Seek medical attention as soon as possible for someone suffering from Frostbite/Hypothermia. • Move pet-animals indoors. Likewise, protect livestock or domestic animals from cold weather by moving them inside.
- Severe exposure to cold wave can lead to Hypothermia – a decrease in body temperature which can cause shivering, difficulty in speaking, sleepiness, stiff muscles, heavy breathing, weakness and/or loss of consciousness. Hypothermia is a medical emergency that needs immediate medical attention.
- Consult doctor for symptoms like various illnesses, running/stuffy nose particularly during the period of COVID -19.

(Source: <https://ndma.gov.in/sites/default/files/PDF/Guidelines/Guidelines-on-Cold-Wave-and-Frost.pdf>)

Q. What is Wind Chill factor?

Wind chill factor takes into account the wind speeds and humidity to find out the apparent temperature felt by humans. This is particularly important on the high wind speed days.

Q. What is role of Northwest wind over north India during cold wave season?

The Northwesterly winds blowing during the December to February months are the cold winds from the Himalayas which allows the prevailing cold conditions to continue and intensify.

Q. What is the period of cold wave over India?

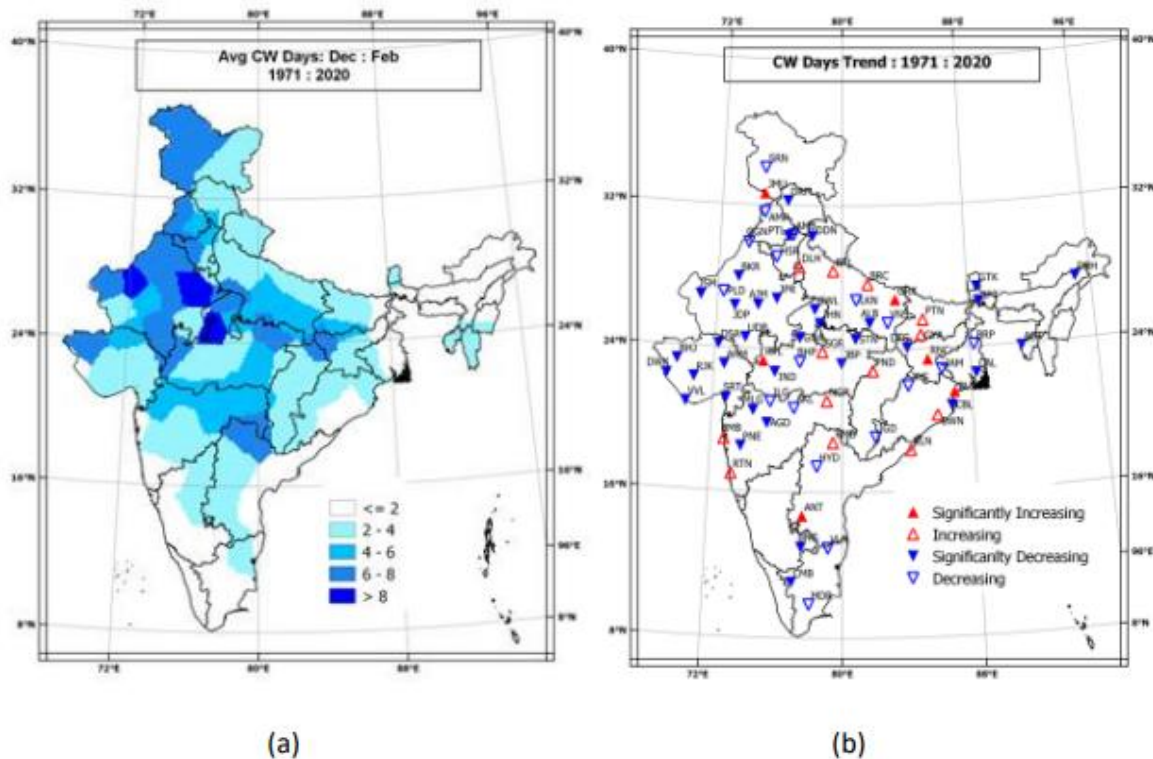
The months from January to February (JF) is the wintertime in almost all over India. However, the minimum temperatures (Tmin) drop below 8°C over many parts of northern India during the month of November to February. December and January are the coldest months over northern India, with less than 8°C normal minimum temperatures over many parts.

Q. What is the longest cold wave spell observed in India?

The data from 1971-2010 suggests Gangtok from Sikkim has experienced the longest Cold Wave spell of 17 days (10-26 December, 1986). (Source Nair et. al. 2015 <https://mausamjournal.imd.gov.in/index.php/MAUSAM/article/view/1384/1209>)

Q. What is the trend of Cold wave over India?

Significant decreasing trends were observed in the frequency and spatial coverage of the Cold Wave /Severe Cold Wave days over Core Cold Zone (North, Northwest, East and central parts of India) of India. This was caused by the significant decreasing trends in the CW/SCW days of majority of the stations from the region which in turn was caused by the significant increasing trends in the season averaged minimum temperatures of these stations. (Source Nair et. al. 2015 <https://mausamjournal.imd.gov.in/index.php/MAUSAM/article/view/1384/1209>)



a) Seasonal climatology map of number of CW days, b) Long term trends in number of cold wave (CW) days during the cold weather season (DJF) during the period 1971-2020. Blue (red) colour shows decreasing (increasing) trends. The trends which are statistically significant at 95% significance level are shown as filled triangles. The climatology was computed by averaging the number of CW days for the period (1971- 2010). (After Smitha et al. 2016).

Q. What are 02,05 and 10 percentile temperatures of a month?

The minimum temperature percentile of a station refers to the ranking of the minimum temperature of any particular day with respect to all the minimum temperatures recorded for all the days of that months in record. For example, if there were 100 minimum temperature value records and these are arranged in ascending order, then the lowest 10th value will be called 10th percentile, 05th value will be called 05th percentile and 02nd value will be termed as 02nd percentile. Statistically, the percentile values convey the information that 10th percentile temperature indicate that the 90 percent of times the minimum temperatures will be warmer than this temperature or in other words the minimum temperature below 10th /05th/02nd percentile indicate the

unseasonably cool minimum temperature day of any month. For example, if in a station the 2nd percentile minimum temperature is 5°C and the forecasted minimum temperature for this station is 4°C, then it means that the minimum temperatures that station will experience will be within 2% of the lower extreme minimum temperatures.

Q. What are the cold wave prone states over India?

Punjab, Haryana, Delhi, UP, Rajasthan, Sikkim, Assam, Madhya Pradesh, West Bengal, Bihar, Gujarat, Jharkhand, Odisha, Tripura, Chhattisgarh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, Tamil Nadu.

Highest number of Cold wave days (annual average 6-8 days) are observed over plains of northwest & adjoining central India based on temperature data from 1971-2019.

Q. What are the average number of cold wave days?

Table 1: Annual average Number of Cold Wave days

S. No.	State/UT	1971-80	1981-90	1991-00	2001-10	2011-19
1	Punjab	6	6	6	7	3
2	Haryana	9	4	3	5	9
3	Delhi	4	3	4	5	4
4	UP	8	3	2	4	6
5	Rajasthan	11	8	4	5	4
6	Sikkim	1	12	0	1	0
7	Assam	3	2	0	0	1
8	Madhya Pradesh	9	5	4	3	5
9	West Bengal	3	1	1	1	2
10	Bihar	5	4	3	4	6
11	Gujarat	6	4	2	3	1
12	Jharkhand	7	2	1	5	4
13	Odissa	2	3	1	2	3
14	Tripura	5	2	3	1	2
15	Chattisgarh	3	5	3	3	6
16	Maharashtra	7	2	5	3	5
17	Telangana	6	2	6	4	6
18	Andhra Pradesh	3	1	1	7	7
19	Karnataka	1	0	0	0	0
20	Tamil Nadu	2	2	2	2	0

Q. How India Meteorological Department (IMD) monitors the cold wave?

IMD has a big network of surface observatories covering entire country to measure various metrological parameters like Temperature, Relative humidity, pressure, wind speed & direction etc. Based on daily minimum temperature station data, climatology of minimum temperature is prepared for the period 1981-2010 to find out normal minimum temperature of the day for particular station. Thereafter, IMD declared cold wave over the region as per its definition.

Q. What is the temporal range of temperature forecast issued by IMD?

IMD follows seamless forecast system since 2016. During beginning of December, minimum temperature and cold wave forecast for season (December to January) are issued by IMD. It is followed up by the Extended Range forecast at meteorological subdivision level, which is issued every Thursday and is valid up to 4 weeks indicating possible cold wave spells. The extended range forecast is followed up by medium range forecast which is valid up to 7 days at district level and is updated 4 times a day at IMD-HQ and 2 times a day by MC/RMC's. Special bulletin is also issued during cold wave season indicating actual temperatures, cold wave and their forecasts:

1. Short to medium range (lead time/validity of 1 to 7 days)
2. Extended range (lead time/validity up to 4 weeks)
3. Seasonal range (lead time/validity up to 3 months)

Q. What is the spatial range of temperature forecast issued by IMD?

IMD issue's location, District, Meteorological Sub-division and Homogeneous regions temperature forecast to its various users and is made available in IMD Website (<https://mausam.imd.gov.in/>).

Q. How IMD predicts the cold wave?

IMD predicts cold wave based on synoptic analysis of various meteorological parameters and from the consensus guidance from various regional & global numerical weather prediction models like, WRF, GFS, GEFS, NCUM, UMEPS, UM Regional etc. run in Ministry of Earth Sciences (MoES) and other international models available under bilateral multi-institutional

arrangement. The objective consensus is derived from the models utilising MME concepts which is further bias corrected by comparing it with initial observations. Thereafter, a subjective consensus is developed among forecasters through the exchange of knowledge, experience and expertise in video conferencing on daily basis to modulate above objective consensus forecast by taking into considerations regional and local variations and other features. By this way operational forecast is prepared by IMD.

Q. How common man may get IMD cold wave information?

A common man may get cold wave information from, All India Weather Forecast Bulletin available at (https://mausam.imd.gov.in/responsive/all_india_forcast_bulletin.php). The cold wave information is shared with concerned State Government Authority, Media and other stakeholders. The general public is also informed through social media, Print & Electronics Media.

In adding to above, warnings are also communicated by all digital mode of communications like over phone (to senior disaster managers), WhatsApp, SMS, e-mail, Facebook, twitter, Instagram and daily/weekly weather in the form of audio-video model and uploaded in YouTube.

Q. How frequently cold wave bulletins are issued?

5 days cold wave warnings are updated four times in day (based on 0530-, 0830-, 1430- & 1730-hours IST) in All India Weather Forecast Bulletin (https://mausam.imd.gov.in/imd_latest/contents/all_india_forcast_bulletin.php) by National Weather Forecasting Centre (NWFC), IMD, New Delhi.

A special All India winter weather bulletin is issued daily at 0400 PM.

The district-wise cold wave warnings are issued by State-level Meteorological Centre/Regional Meteorological Centers of IMD.

Q. What are favorable conditions for cold wave?

Cold Wave conditions are associated with fall in minimum temperatures during the Winter season. In this season prevailing winds over the Indo Gangetic Plains (IGP) are north-

westerlies. As north-westerlies are the winds from colder regions of Central Asia/Hindukush region, they bring temperature fall over the IGP and hence the Cold Wave Conditions.

- Whenever a Western Disturbance (WD) approach clouding develops over IGP bringing fall in Maximum temperatures and rise in minimum temperatures. Thus, Cold Wave conditions over IGP get abated at the approach of a WD.
- When a WD moves away from the Indian region, clear skies start appearing over the IGP leading to rise in maximum and fall in minimum temperatures.
- Whenever a WD affects North India, winds in lower levels over the region are either from Arabian Sea or from both Bay of Bengal and Arabian Sea. Given that both types of winds are the moist ones, minimum temperatures rise. At the same time, clouding over the region leads to lesser penetration of solar insolation into the earth and hence fall in maximum temperatures.
- Cold Day conditions are associated with fall in maximum temperatures during the winter season. Cold Day conditions occur when there is persistent low clouding over North Indian plains/IGP in the winter season.
- Low clouds prevent solar insolation entering into earth's surface which causes fall in maximum temperatures.
- If an active WD affects North India in the winter season and causes widespread rain over the region along with isolated hailstorms it leaves behind abundant moisture over the IGP. Now if after the passage of the WD, lower-level westerlies (cold and dry) are not strong enough to absorb this abundant moisture it will cause persistent low cloud cover and hence the Severe Cold Day conditions over the region. Similar phenomenon was witnessed during second half of December, 2019. (**Fig. 1**)
- Development of anomalous high over the region causes low cloud cover which in turn leads to preventing the solar heating of the earth surface and hence the severe cold day condition.

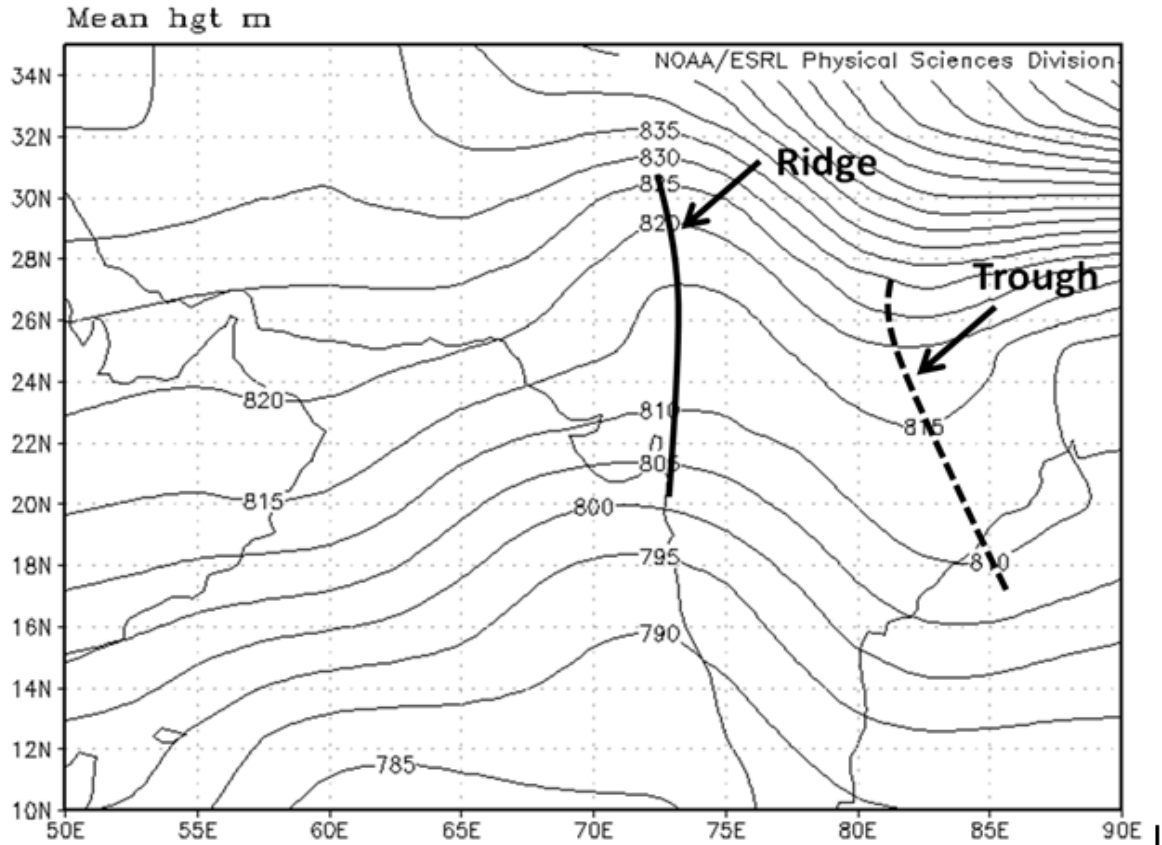


Fig. 1: Ridge and trough lines being shown in 925 hPa mean geopotential height chart for 16-31 December, 2019.

Q. What is impact based cold wave warning issue by India Meteorological Department (IMD)?

India Meteorological Department issues following colour coded impact based cold warning jointly with National Disaster Management Authority.

Table 1. Impact based colour coded alert & warning for cold wave

Color code	Alert	Warnings	Impact	Suggested Action
Green (No Action)	Normal day	Minimum temperatures are near normal.	Comfortable temperature.	No precautionary action required.

<p>Yellow Alert (Be Updated)</p>	<p>Cold Wave Alert</p>	<p>Cold wave conditions in isolated areas persist for Two days.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Moderate temperature. Chilly winds may aggravate cold at time. <input type="checkbox"/> Cold is tolerable but mild health concern for vulnerable people. (Infants, pregnant women, elderly, people with chronic diseases etc.) 	<ul style="list-style-type: none"> <input type="checkbox"/> Avoid prolonged exposure to cold. <input type="checkbox"/> Wear several layers of loose fitting, light weight; warm woollen clothing rather than one layer of heavy cloth. <input type="checkbox"/> Cover your head, neck, hands and toes adequately as majority of heat loss occurs through these body parts.
<p>Orange Alert (Be Prepared)</p>	<p>Severe Cold Wave Alert</p>	<p>(I) Severe cold wave conditions persist for two days. (II) Though not severe, but cold wave conditions persist for Four days or more.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> An increased likelihood of various illnesses like flu, running/ stuffy nose or nosebleed, which usually set in or get aggravated due to prolonged exposure to cold. <input type="checkbox"/> Do not ignore shivering. It is the first sign that the body is losing heat. Get Indoors. <input type="checkbox"/> Frostbite can occur due to prolonged exposure to cold. The skin turns pale, hard and numb and eventually black blisters appear on exposed body parts such as fingers, toes, nose and or earlobes. <input type="checkbox"/> Severe frostbite needs immediate medical attention and treatment. 	<ul style="list-style-type: none"> <input type="checkbox"/> Listen to radio; watch TV, read newspaper for weather updates/ forecasts. <input type="checkbox"/> Wear insulated/waterproof shoes. <input type="checkbox"/> Moisturize your skin regularly with oil, petroleum jelly or body cream. <input type="checkbox"/> Eat healthy fruits and vegetables rich vitamin-C and drink lots of fluids to maintain adequate immunity. <input type="checkbox"/> Avoid or limit outdoor activities. <input type="checkbox"/> Keep dry, if wet, change cloths immediately to prevent loss of body heat. <input type="checkbox"/> Warm the affected area of the body slowly with lukewarm water; do not rub the skin vigorously. <input type="checkbox"/> If the affected skin area turns black, immediately consult a doctor. <input type="checkbox"/> Maintain ventilation while using Heaters to avoid inhaling toxic fumes. <input type="checkbox"/> Take safety measures while using electrical and gas heating devices. <input type="checkbox"/> Don't drink alcohol. It reduces your body temperature.

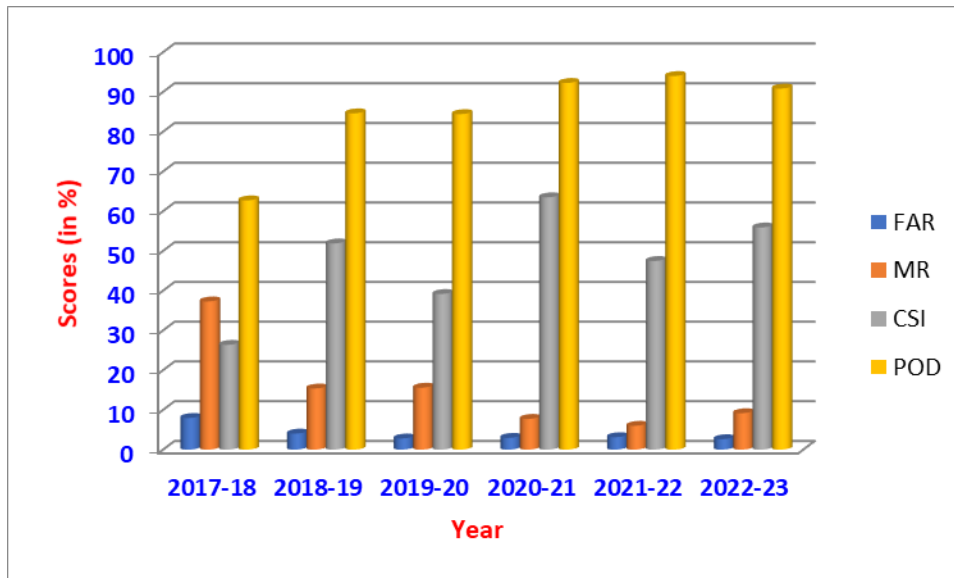
				<input type="checkbox"/> Drink hot drinks regularly.
Red Alert (Take Action)		(I) Severe cold wave conditions persist for more than two days. (II) Total number of cold wave/severe cold wave/days exceeding Six days.	<input type="checkbox"/> Severe exposure to cold wave can lead to Hypothermia; a decrease in body temperature which cause confusion, shivering, difficulty in speaking, sleepiness, stiff muscles, heavy breathing, weakness and/or loss of consciousness. Hypothermia is a medical emergency that needs immediate medical attention. <input type="checkbox"/> Frost and cold wave affect pulse crops and livestock.	<input type="checkbox"/> Along with suggested action for orange alert, extreme care needed for vulnerable people. <input type="checkbox"/> Regularly check on elderly neighbours, especially those who live alone. Stay Indoors, if possible. Avoid unnecessary exertion. <input type="checkbox"/> Locate designated public shelter nearby. <input type="checkbox"/> In case of electricity or heating mechanism failure, take the affected person to such designated shelters. <input type="checkbox"/> Seek medical attention as soon as possible for someone suffering from frostbite/ Hypothermia. <input type="checkbox"/> Do not give the affected person any fluids unless fully alert. <input type="checkbox"/> Store adequate water as pipes may freeze. <input type="checkbox"/> Move pets indoors. Likewise, protect livestock or other big animals from cold weather by moving them to an enclosure.

Q. Does IMD conducts any pre-season exercise for cold waves?

The pre-season preparedness exercise is conducted by National Disaster Management Authority in which an important presentation is given by India Meteorological Department regarding the preparedness and initiatives with respect to forecasting services of cold waves.

Q. What is the Cold Wave forecast skill of IMD?

Cold wave forecast skill (False Alarm Ratio (FAR), Missed Rate (MR), Critical Success Index (CSI) and Probability of Detection (PoD)) during 2017-18 to 2022-23 for December to February are as follow:



The Probability of Detection has been improving from past years and has been approx. over 90%.

Q. Who can be contacted for cold wave information & warning in IMD?

Round the clock duty officer is available in National Weather Forecasting Centre, IMD, New Delhi. The contact address is given below:

National Weather Forecasting Centre,

India Metrological Department,

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