

Number 65, February 2006

# The Island Climate Update

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Organization

## January's climate

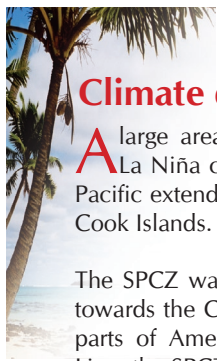
- Outgoing longwave radiation (OLR) and rainfall anomalies characteristic of weak La Niña conditions – enhanced convection over Indonesia, Papua New Guinea, and northern Australia – suppressed convection in the central equatorial Pacific
- Active South Pacific Convergence Zone (SPCZ) further south than average
- Above average rainfall in parts of Fiji, Samoa, southern Tuvalu, Tonga, and New Caledonia; much drier in Western Kiribati
- Much warmer than average in southern Tonga and southern French Polynesia
- Three tropical cyclones so far

## El Niño/Southern Oscillation and seasonal rainfall forecasts

- Equatorial Pacific is showing characteristics of a weak La Niña
- Below average rainfall over Western and Eastern Kiribati
- Large area of near or above average rainfall from Fiji southeastwards to Austral Islands







## Climate developments in January 2006

A large area of suppressed convection, characteristic of weak La Niña conditions, continued to affect the central equatorial Pacific extending from Nauru to Eastern Kiribati and the Northern Cook Islands.

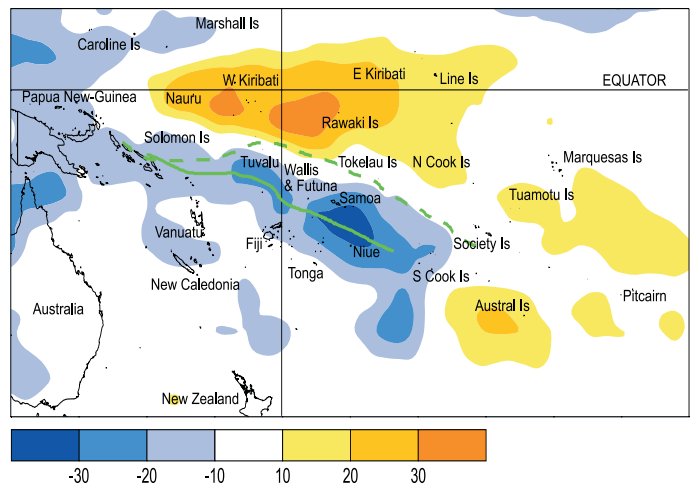
The SPCZ was quite active, extending from the Solomon Islands towards the Cook Islands, resulting in above average rainfall over parts of American Samoa and Northern Tonga. Near the Date Line, the SPCZ was located further south than average. In the west it merged with a large and active area of enhanced convection, associated with the monsoon trough, which affected Indonesia, Papua New Guinea, and northern Australia.

Rainfall was at least 125% of average in parts of Fiji, Samoa, southern Tuvalu, and Tonga, as well as parts of New Caledonia. January rainfall was less than 50% of average in the north of Western Kiribati and northern Tuvalu.

In French Polynesia, Tahiti-Faaa recorded 18 days with thunderstorms during the month, their highest on record for January. In Fiji, Rotuma Island recorded 28 days of rain.

Mean air temperatures were at least 1 °C above average in southern Tonga and southern French Polynesia. They were near average in New Caledonia.

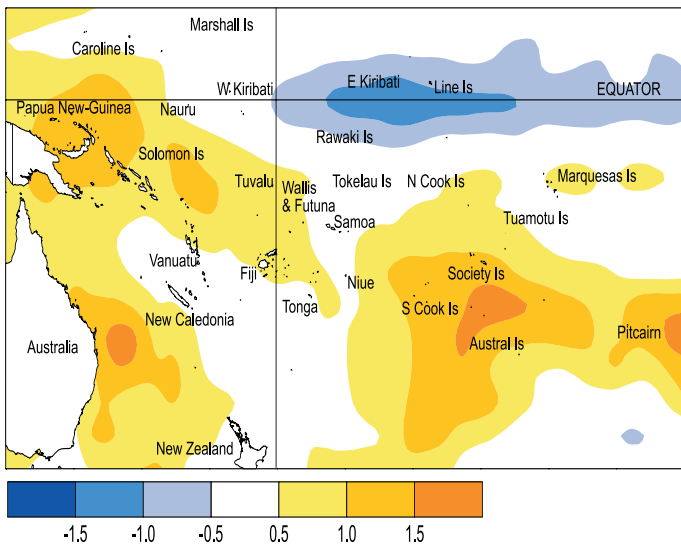
Tropical Southwest Pacific mean sea-level pressures tended below average over much of the tropical Pacific within about 10° both north and south of the equator, extending west across Papua New Guinea. This was a marked change from past months when pressures were below average east of the Date Line.



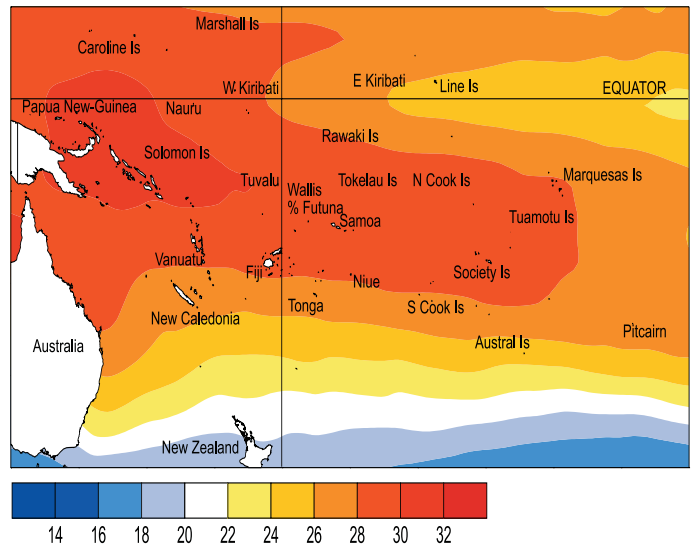
Outgoing Long-wave Radiation (OLR) anomalies, in  $Wm^{-2}$ . The January 2006 position of the SPCZ, as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line (blue equals high rainfall and yellow equals low rainfall).

Equatorial surface easterlies were very persistent along the equator, occurring in about 99% of observations at Tarawa.

Country	Location	Monthly Rainfall (mm)	% of average	Comments
Fiji	Rotuma	954	269	Record high
New Caledonia	Ouanaham	368	204	Well above average
New Zealand	Raoul Island	30	23	Well below average



Sea surface temperature anomalies (°C) for January 2006.



Mean sea surface temperatures (°C) for January 2006.

Currently, the equatorial Pacific Ocean is showing characteristics of a weak La Niña. This development is unprecedented for this time of the year, and is likely to be short-lived, based on some global diagnostic models.

The region of largest negative sea surface temperature (SST) anomalies migrated from near the South American coast towards the central Pacific in January, associated with enhanced trade winds and suppressed convection centred near the Date Line. Convection is enhanced over northern Australia and Indonesia. The NINO3 SST anomaly rose to about 0.4 °C for January (-0.7 °C in December, -0.5 °C for November-January) and NINO4 fell to -0.3 °C (+0.2 °C in December, +0.1 °C for November-January). A cold subsurface temperature anomaly centred near 140° W strengthened during the month, but remained stationary. The Southern Oscillation Index

(SOI) rose above +1 in January, from a neutral value in December (-0.1). The 3-month mean SOI is still in the neutral range. A moderate Madden-Julian Oscillation event moved through the western Pacific during the last week of January.

One in three models show La Niña conditions for February-April, all trending back towards neutral conditions by mid-year. The latest NCEP/CPC statement (9 February) suggests La Niña conditions expected to continue for next 3 to 6 months, while the IRICP summary gives a 50% chance of La Niña in the next few months, reducing to 25% (climatology) by mid-year.

The current conditions continue but may ease by southern hemisphere winter 2006.



## Tropical rainfall outlook: February to April 2006

A large region of enhanced convection is likely from Fiji southeastwards to the Austral Islands, including Tonga, Niue, the Northern and Southern Cook Islands, and the Society Islands.

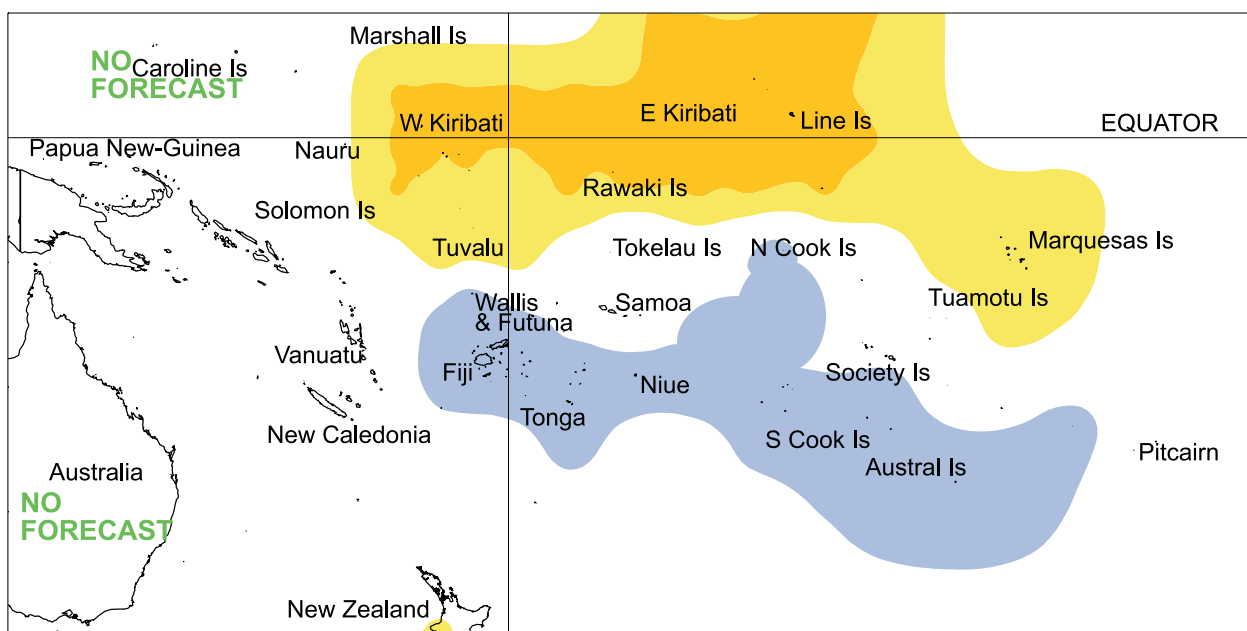
Suppressed convection is expected over Western and Eastern Kiribati, where rainfall is forecast to be below average. Rainfall is likely to be near or below average over Tuvalu and the Marquesas Islands.

Rainfall is expected to be near average for the rest of the countries in the region.

The global forecast model skills are moderate for this time of the year, as the wet season continues.

NOTE: Rainfall estimates for Pacific Islands for the next three months are given in the table. The tercile probabilities (e.g., 20:30:50) are derived from the interpretation of several global climate models. They correspond to the odds of the observed rainfall being in the lowest (driest) one third of the rainfall distribution, the middle one third, or the highest (wettest) one third of the distribution. On the long-term average, rainfall is equally likely (33% chance) in any tercile.

Island group	Rainfall outlook	Outlook confidence
Fiji	15:40:45 (Near or above average)	Moderate
Tonga	15:45:40 (Near or above average)	Moderate
Niue	20:40:40 (Near or above average)	Moderate
Northern Cook Islands	15:45:40 (Near or above average)	Moderate
Southern Cook Islands	20:40:40 (Near or above average)	Moderate
Society Islands	20:40:40 (Near or above average)	Moderate
Austral Islands	20:40:40 (Near or above average)	Moderate
Papua New Guinea	20:50:30 (Near average)	Moderate
Solomon Islands	20:50:30 (Near average)	Moderate
Vanuatu	25:50:25 (Near average)	Moderate
Wallis & Futuna	20:50:30 (Near average)	Moderate
Samoa	20:45:35 (Near average)	Moderate
New Caledonia	30:40:30 (Near average)	Moderate
Tokelau	35:45:20 (Near average)	Moderate
Tuamotu Islands	25:50:25 (Near average)	Moderate
Pitcairn Island	20:50:30 (Near average)	Moderate
Tuvalu	40:40:20 (Near or below average)	Moderate
Marquesas Islands	45:40:15 (Near or below average)	Moderate
Western Kiribati	45:30:25 (Below average)	Moderate
Eastern Kiribati	45:35:20 (Below average)	Moderate



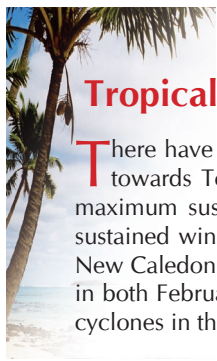
Rainfall outlook map for February to April 2006.

## Forecast validation: November 2005 to January 2006

Enhanced convection and above average rainfall was expected over the Solomon Islands and the Southern Cook Islands. Near or above average rainfall was expected from Papua New Guinea east-southeast to Pitcairn Island, including Fiji, Wallis & Futuna, Tonga, Samoa, Niue, and the Austral and Tuamotu Islands. Suppressed convection with below average rainfall was forecast for Eastern Kiribati, with near or below average rainfall expected in Tuvalu, Tokelau, and the Marquesas Islands. Near average rainfall was expected elsewhere in the region.

Areas of above average rainfall affected the Solomon Islands, as

well as Fiji, Tonga, American Samoa, Niue, and the Marquesas Islands. Suppressed convection or below average rainfall occurred over Western and Eastern Kiribati, extending to the Northern Cook Islands and the Society Islands. Rainfall was higher than expected in the Marquesas Islands, and lower than forecast in New Caledonia, Vanuatu, Western Kiribati, and the Southern Cook Islands. The overall 'hit' rate for the November 2005 – January 2006 rainfall outlook was about 70%. Outcomes for the Solomon Islands (based on OLR anomalies) have been consistent with forecasts for twelve consecutive months.



## Tropical cyclone update

There have been three tropical cyclones to date. The first was 'Tam' which occurred north of Viti Levu, Fiji, on 12 January, tracking towards Tonga on the 13th, and then southeast to pass west of Niue, with gale force winds. 'Urmil' was next, on the 15th, with maximum sustained winds of 85 km/h – but well south of Niue. Tropical cyclone 'Jim' was the third occurrence this season, with sustained wind speeds of 150 km/h (hurricane force). 'Jim' was located in the western Coral Sea on 28 January, tracked east, north of New Caledonia, and then southeast to pass south of Vanuatu. There are on average two to three tropical cyclone occurrences per month in both February and March. The March issue of the ICU will provide an update on information relating to any occurrences of tropical cyclones in the region.

## Tropical Pacific rainfall – January 2006

Territory and station name	January 2006 rainfall total (mm)	Long-term average (mm)	January 2006 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
<b>Australia</b>						
Cairns Airport	333.6	395	84	86	1417	1941
Townsville Airport	451.2	271	166	9	1142	1940
Brisbane Airport	174.2	158	110	10	804	1929
Sydney Airport	68.6	100	69			1929
<b>Cook Islands</b>						
Rarotonga Airport	271.7	226	120	24	668	1929
Rarotonga EWS	232.4	226	103	53	204	2000
<b>Fiji</b>						
Rotuma	954.1	355	269	28	679	1912
Udu Point	519.0	313	166	17	991	1946
Nadi	362.5	343	106	13	981	1942
Nausori	242.6	365	66	108	686	1956
Ono-I-Lau	288.9	179	161	16	381	1943
<b>French Polynesia</b>						
Hiva Hoa, Atuona	72.8	158	46	17	883	1951
Bora Bora, Motu	227.0	247	92	73	690	1976
Tahiti - Faa'a	263.8	273	97	46	956	1919
Tuamotu, Takaroa	75.8	192	39	55	681	1953
Gambier, Rikitea	217.4	146	149	14	292	1952
Tubuai	220.4	203	109	20	536	1953
Rapa	278.6	239	117	25	696	1951
<b>New Caledonia</b>						
Ile Art, Belep	218.4	253	86	21	517	1962
Koumac	164.0	167	98	4	578	1951
Ouloup	322.0	177	182	36	608	1966
Ouanaham	367.6	180	204	25	576	1961
Poindimie	555.8	370	150	43	1245	1965
La Roche	262.8	190	138	28	578	1956
La Tontouta	130.6	123	106	6	380	1949
Noumea	69.3	107	65	0	383	1863
Moue	248.8	171	145	34	711	1972

## Tropical Pacific rainfall – January 2006



Territory and station name	January 2006 rainfall total (mm)	Long-term average (mm)	January 2006 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
<b>Kiribati</b>						
Tarawa	<i>15.2</i>	250	6	2	825	1946
<b>New Zealand</b>						
Kaitaia	89.8	82	110	2	287	1985
Whangarei Airport	156.6	84	186	1	315	1937
Auckland Airport	79.2	67	118	4	206	1962
<b>Niue</b>						
Hanan Airport	<i>454.8</i>	256	178	59	499	1996
<b>North Tasman</b>						
Lord Howe Island	66.4	115	58	10	291	1886
Norfolk Island	63.2	91	69	8	340	1921
Raoul Island	30.4	130	23	2	464	1937
<b>Tonga</b>						
Niuaotupapu	419.5	276	152	45	608	1947
Nuku'alofa	325.0	174	187	10	582	1944
Lupepau'u	322.1	288	112	82	686	1995
Fua'amotu Airport	193.8	201	96	4	533	1980
<b>Tuvalu</b>						
Nui Island	78.4	422	19	72	890	1941
Funafuti	380.8	386	99	166	1142	1927
Nanumea	64.1	357	18	39	1143	1941
Nuilakita	755.2	376	201	73	816	1941
<b>Vanuatu</b>						
Pekoa	238.2	324	74	53	671	1951
Lamap	<i>110.3</i>	252	44	39	678	1960
Bauerfield	<i>157.3</i>	249	63	28	434	1985
Tanna/Burtonfield	<i>200.0</i>	162.123	19.8	373		1961
Aneityum	<i>292.0</i>	276	106	18	817	1958
<b>Wallis &amp; Futuna</b>						
Wallis island, Hififo	<i>526.4</i>	334	158	126	573	1951
Maopopo, Futuna Island	<i>191.8</i>	331	58			

Rainfall totalling 200 percent or more is considered well above average. Totals of 40 percent or less are normally well below average. **Highlighted values are new records.**

Data are published as received and may be subject to change after undergoing quality control checks. The data in italics are obtained from synoptic weather reports. These can sometimes differ from the true values, due to communications or station outage, etc.





# The Southwest Pacific Climate in 2005

Stuart Burgess and Dr Jim Salinger, NIWA

The year 2005 saw El Niño/Southern Oscillation (ENSO) conditions evolve from a weakly negative state in the first quarter of the year, to a situation with several La Niña-like features in the central equatorial Pacific in the latter part of the year (Fig. 1).

A high frequency of surface equatorial westerlies occurred near the Date Line in February (the most since the last El Niño in 2002). However, these conditions were only temporary, trade winds generally being near normal in strength at other times of the year. There was also some ENSO influence on the location of the South Pacific Convergence Zone (SPCZ) during the year. West of the Date Line, the SPCZ was further north than usual from January through August, and further south than usual from November through December. East of the Date Line, the SPCZ was very weak from March through August. It was further south than usual from October through December. Above average equatorial sea surface temperatures (SSTs) occurred with the weakly negative El Niño; however, the region of positive SST anomalies drifted west as the El Niño faded. Some La Niña-like features were seen in the central equatorial Pacific. Outgoing Long-wave Radiation (OLR) anomalies from August through December, with enhanced convection over Papua New Guinea, and suppressed convection during those months over Western and Eastern Kiribati, Tokelau, Tuvalu, and the Northern Cook Islands. For much of the year, mean sea level pressures were above average west of the Date Line, and below average in the east.

Above average SSTs occurred throughout much of the tropical Southwest Pacific during 2005 (Fig. 2), being about +1.0 °C above average around Western Kiribati, and at least +0.5 °C above average in many other island nations, especially those north of 20 °S. New Caledonia, the Southern Cook Islands, the Austral Islands, and Pitcairn Island were surrounded by near average SSTs. Southwest Pacific island surface air temperature anomalies for 2005 were consistent with the SST anomalies throughout the region. It was an extremely warm year in Tahiti-Faaa, central French Polynesia, where the mean temperature was 27.0 °C (+0.8 °C above the 1971–2000 normal), and equal highest since measurements commenced in 1957.

Southwest Pacific 2005 OLR anomalies (Fig.3) showed a region of enhanced convection over Papua New Guinea extending towards the Solomon Islands. There was also an area of weakly enhanced convection over Niue and the Southern Cook Islands, as well as Pitcairn Island. Convection was suppressed in 2005 over Western and Eastern Kiribati, Tokelau, Tuvalu, Wallis and Futuna, the Northern Cook Islands, and the Marquesas Islands. The year's rainfall distribution indicates similarities to the OLR pattern. However, for rainfall there were not many significant anomalies. Rainfall was at least 110% of normal affecting a region extending from Niue to north and east of Fiji, and also parts of southern French Polynesia. In contrast, rainfall was less than 90% of average throughout much of New Caledonia.

Nine tropical cyclones affected the Southwest Pacific during the 2004–05 season, the same as the average number that are normally expected. About half reached major hurricane strength, with sustained wind speeds of at least 168 km/h. All but one of the Southwest Pacific tropical cyclones originated east of the Date Line, and all occurred within the December 2004 to April 2005 period.

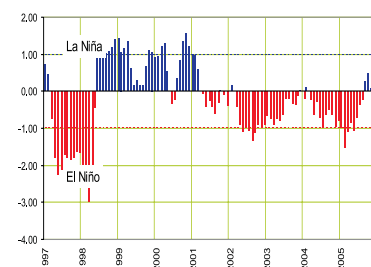


Figure 1. The Southern Oscillation Index (SOI). The index displayed neutral values for the first half of the year then drifted negative into the weak El Niño range for the remainder of the year.

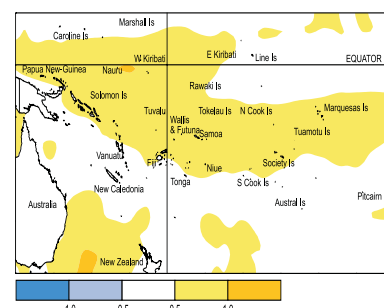


Figure 2: Sea Surface temperature (SST) anomalies (departure from average). Yellow or orange areas represent warmer than average sea surface.

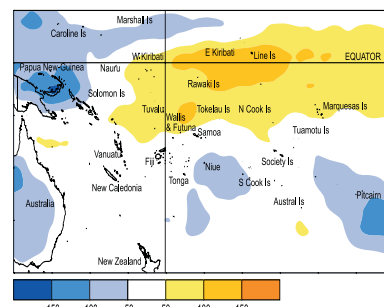


Figure 3. Outgoing Long-wave Radiation (OLR) anomalies (departure from average), in  $Wm^{-2}$  are represented by coloured areas, and rainfall percentage of average, shown by numbers. High radiation levels (yellow or orange) are typically associated with clearer skies and lower rainfall, while cloudy conditions lower the OLR (blue) and typically mean higher rainfalls.



## The Island Climate Update

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Your comments and ideas about The Island Climate Update are welcome. Please contact:

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### Sources of South Pacific rainfall data

This bulletin is a multi-national project, with important collaboration from the following Meteorological Services:

**American Samoa, Australia, Cook Islands, Fiji, French Polynesia, Kiribati, New Caledonia, New Zealand, Niue, Papua New Guinea, Pitcairn Island, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu**

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Wendy St George,  
NIWA

Requests for Pacific Island climate data should be directed to the Meteorological Services concerned.

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This summary is prepared as soon as possible following the end of the month, once the data and information are received from the Pacific Island National Meteorological Services (NMHS). Delays in data collection and communication occasionally arise. While every effort is made to verify observational data, NIWA does not guarantee the accuracy and reliability of the analysis and forecast information presented, and accepts no liability for any losses incurred through the use of this bulletin and its content.

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