



# Marine Weather Review

## Tropical Atlantic and Tropical East Pacific Areas

### January through April 2002

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#### Southwest Gulf of Mexico Storm

**Events February, 2002:** Several gale events typically occur over the southwest Gulf of Mexico each winter season. The gales develop when strong high pressure systems over the central United States build southward along the Mexican coast. The strong northerly winds are magnified over the extreme southwest Gulf as they funnel down the eastern slopes of the Sierra Madre Mountains. In Mexico, these events are known as a *Achoclatero* or *Achocolate gale* (American Meteorological Society, 2000) as large amounts of blowing sand and dust produce a brownish or chocolate-colored sky. In February, two such events produced storm force winds on both land and sea.

The first storm event occurred between 10-12 February. It began when a strong cold front entered the Gulf of Mexico shortly after 0600 UTC 10 February. An unusually strong 1052 mb high pressure center was located northwest of the front over the northern Rockies. As the high began to build over the Gulf behind the front winds increased to gale force over the western Gulf of Mexico. By 1200 UTC, the front extended from southeast Louisiana to the Mexican coast near 23EN 98EW. Buoy 42002 in the western Gulf near 26EN 94EW observed 34 kt winds with gusts to 40

kt at 1700 UTC. Wave heights at buoy 42002 quickly rose to 4.5 m (14 ft) by 2300 UTC.

At 0000 UTC 11 February, the front extended from the western Florida Panhandle to the southwest Bay of Campeche. The **Koeln Express** (9VBL) provided extremely useful hourly-observations from the southwest Bay of Campeche during this event (Figure 1). The ship experienced winds above gale force for 24 consecutive hours and

encountered storm force winds for 8 hours. The **Koeln Express** observed peak winds of 58 kt at both 0400 and 0500 UTC. Based on the observations a storm warning was issued for the extreme southwest Gulf of Mexico.

By 1800 UTC 11 February, the cold front was located from south-central Florida to the eastern Bay of Campeche. High pressure northwest of the front weakened and moved into eastern Texas. At this time, storm force winds ended over the southwest

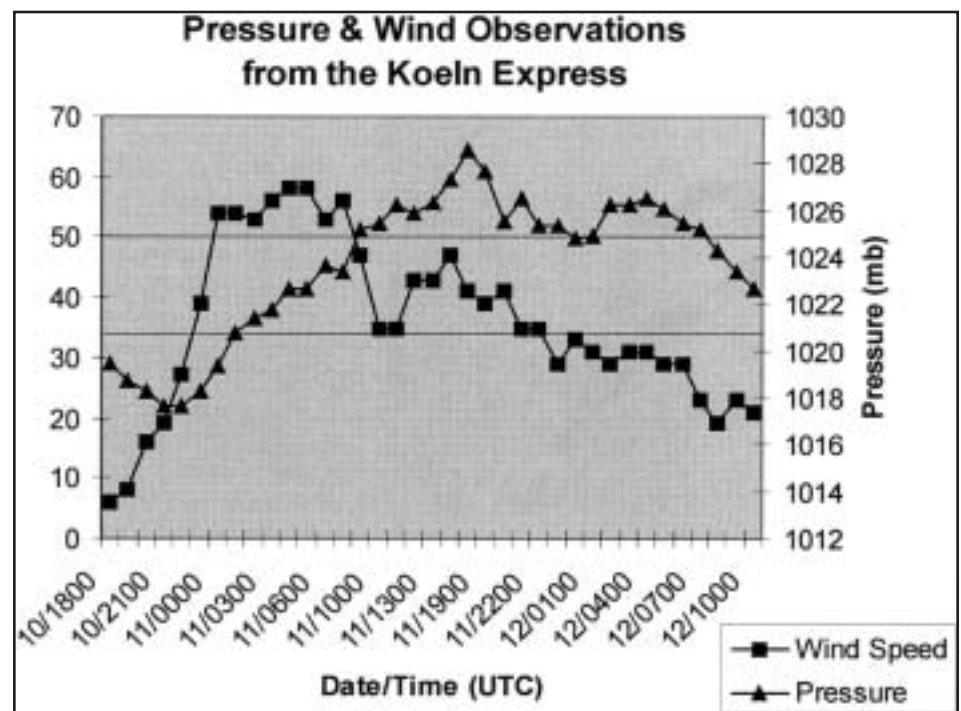


Figure 1. Graph of Pressure and Wind Observations from the Koeln Express from 1800 UTC 10 February through 1000 UTC 12 February 2002. The two horizontal lines represent the 34- and 50-kt wind speeds.



Gulf and by 0600 UTC 12 February winds finally decreased below gale force over the entire Gulf of Mexico. This event also produced strong gales over the Gulf of Tehuantepec. It is suspected that the event reached storm force over the Gulf of Tehuantepec, however no verification of storm force winds was received.

The second storm event began early on 22nd February as a cold front entered the northwest Gulf. The front moved rapidly southeastward as a 1036 mb high over the Rockies built southward. The winds quickly increased to gale force behind the front. At both 1100 and 1200 UTC buoy 42002 reported northerly winds of 36 kt with gusts to 44 kt. Sea heights increased from less than 1 m (2-3 ft) to 3.5 m (11 ft) in 3 hours. Again, the strongest winds occurred over the southwest Gulf of Mexico along the eastern slopes of the Sierra Madre Mountains. An 1137 UTC Quikscat pass detected 40- to 50-kt winds from 21N to 25N west of 95W. At 1145 UTC, Veracruz reported northerly winds of 18 kt. By 1318 UTC the winds at Veracruz increased very dramatically to 50-kt with gusts to 60 kt. At 1609 UTC, Veracruz observed sustained winds of 60 kt with occasionally gusts estimated to an incredible 100 kt (Figure 2). Visibilities dropped to 1 statute mile in blowing sand, which is precisely why these events are referred to as a "chocolate gale." Just offshore, the **Lykes Explorer** (WGLA) near 20.5N 96W experienced northwest winds of 44 kt and combined seas of 5 m (16 ft) at 1800 UTC. By 1200 UTC 23 February, high pressure became established over the western Gulf along the coast of Texas and Mexico. At this time, the strong northerly winds decreased below gale force.

This event also produced storm force winds over the Gulf of Tehuantepec as indicated by a Quikscat pass at 2338 UTC 23 February.

### Significant Weather of the Period

#### Tropical Cyclones:

None.

#### Other Significant Events of the Period

The January to April time period typically brings several strong cold outbreaks that produce gale force winds over the Gulf of Mexico and western Atlantic. Besides the two southwest Gulf of Mexico storm events featured above, five additional gale events occurred over the western Gulf of Mexico during the period. A couple of these events produced gales

over the western Atlantic, while two storm centers north of the TPC forecast area briefly produced gales over the eastern Atlantic south of 31N.

Several Gulf of Tehuantepec gale events occurred in the eastern Pacific.

### Atlantic, Caribbean and Gulf of Mexico

**Gulf of Mexico and West Atlantic Gales 2-7 January:** During the first week of January, two separate lows developed over the Gulf of Mexico and produced gale conditions over portions of the Gulf and west Atlantic. The first low developed early on 1 January, along a stationary front over the southwest Gulf of Mexico. The low moved northeastward into the central Gulf and strengthened into a gale center by 0000 UTC 2 January. Gale force winds occurred over the

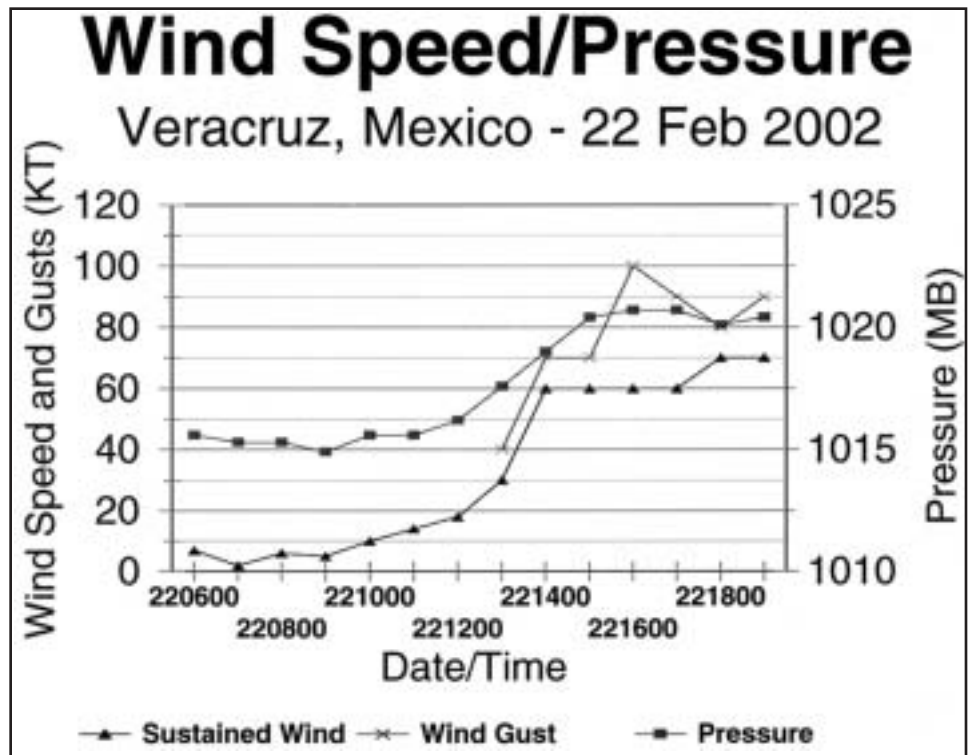


Figure 2. Graph of Pressure and Wind Observations from Veracruz, Mexico from 0600 UTC through 1900 UTC 22 February 2002. An estimated peak gust of 100 kt was indicated at 1600 UTC.



north and west semicircles of the system. Buoy 42002 near 26N 93.5W reported northerly winds of 33 kt with gusts to 40 kt, and seas of 4 to 4.5 m (14 ft) around 0600 UTC 2 January. The ship **Pequot** (ELTF6) over the central Gulf of Mexico encountered 35 kt winds at 0600 UTC. Later on the 2nd, the gale moved east-northeastward across the eastern Gulf of Mexico and central Florida. The system brought widespread rain to much of Florida and produced a weak tornado in Homestead (just south of Miami). At 0000 UTC 3 January, the gale was centered over the west Atlantic near 31N 79W. By this time, gale conditions ended over most of the Gulf of Mexico; however, as strong high pressure became established over the Gulf, strong northwest winds continued. Along the coast of Mexico, these winds reached gale force, and the **Koeln Express** reported hourly observations of 35 to 43 kt near Veracruz between 0500 and 1600 UTC. The gales finally ended over the entire Gulf by 0000 UTC 4 January.

Early on 4 January, the gale center strengthened into a storm off the North Carolina coast.

At this time, strong west to northwest gale force winds extended south to 27N west of 65W over the west Atlantic. A 1048 UTC Quikscat pass detected 35 to 40 kt winds. At 1200 UTC the **Arctic Ocean** (C6T2062) observed 37-kt winds near 30N 75W. The gale force winds spread eastward as the storm center moved northeast of Bermuda later on 4th January. Early on the 5th, the ship **Kota Perwira** (DEEU) encountered 41-kt winds and combined seas of 5 to 7.5 m (17 to 25 ft) near 30N 56W.

Shortly after 1200 UTC 5 January, the storm center moved farther north, and winds decreased below gale force south of 31N.

The second low developed along the coast of Texas on the 5th. It tracked farther north than the previous low, and at 0000 UTC 6 January was centered along the coast of southeast Louisiana. Shortly thereafter, several buoys in the northeast Gulf reported gale force winds. At 0200 UTC, buoy 42040 near 29N 88W recorded southeast winds of 36 kt, with gusts to 46 kt, and sea heights near 5 m (16 ft). Buoy 42039 near 29N 86W observed southeast winds of 37 kt with gusts to 44 kt at 0600 UTC. At the same time, the **Chevron South America** (ZCAA2) also encountered 36 kt winds over the northeast Gulf. After the associated cold front moved across the eastern Gulf, strong southwest to west winds continued. Sea heights continue to rise at buoy 42039 and eventually peaked at 5.6m (18 ft) at 1600 UTC. By 1800 UTC, the low was centered over eastern South Carolina with the trailing cold front across south Florida to western Cuba. At this time, winds decreased below gale force over the Gulf of Mexico but increased to gale force over the western Atlantic. At 1800 UTC, drifting buoy 41645 near 30N 78W reported south winds of 40 kt, while buoy 41010 (near 29N 78.5W) observed south winds of 32 kt, with gusts to 41 kt and seas to 4.6 m (15 ft) just east of the front. At 0600 UTC 7 January, the low was located along the coast of New England, with the trailing cold front through 31N 73W to central Cuba. At this time, winds decreased below gale force over the Atlantic south of 31N.

### **East Atlantic Cold Front 23-24**

**January:** A strong cold front associated with a storm center well north of 31N produced a brief period of gale force winds over the eastern section of the TPC forecast area. At 1800 UTC 23 January, the front extended through 31N 42W to 25N 65W. At 2143 UTC, Quikscat pass indicated gale force winds north of 28N between 35W and 48W. Two ships, the **Douce France** (FNRS) and the **Pavel Vavilov** (UCKG), encountered northwest winds of 40 kt near 30N 45W at 0000 UTC 24 January. The event ended by 1200 UTC as the front reached from 27N 35W to 22N 55W.

### **Southwest Gulf of Mexico Gale 25-26**

**January:** The next in a series of strong Gulf of Mexico cold fronts moved off the coast of Texas just before 0000 UTC 25 January. A strong 1041-mb high, located over the central plains began building southward over the Gulf behind the front. As the front moved quickly southward across the western Gulf, winds increased to gale force shortly after 0600 UTC. Quikscat data from 1153 UTC detected an area of 30- to 35-kt northerly winds south of 25N west of 95W. Two ships over the southwest gulf, the **Empire State** (KKFW) and the **SIWN** (name unknown), observed north to northwest winds of 37 kt at 0000 UTC 26 January. The high pressure north of the area weakened and moved eastward across the southeast United States, and by 1200 UTC a Quikscat pass indicated that gale force winds had ended.

### **Southwest Gulf of Mexico Gale 1-2**

**February:** Another gale event occurred on 1-2 February over the





southwest Gulf of Mexico. A strong cold front moved off the coast of Texas around 0000 UTC 1 February. By 1200 UTC February 1, the front extend from the western Florida panhandle to the southwest Bay of Campeche. Northwest of the front, a 1036-mb high centered over Colorado began building southeastward. Northerly gale force winds began blowing along the coast of Mexico south of 25N west of 94W. At 1200 UTC Tampico, Mexico observed 35-kt northerly winds. Quikscat data at 0035 UTC 2 February detected gale force winds over the southwest Bay of Campeche. By 1200 UTC 2 February, the pressure gradient had weakened along the coast of Mexico, and winds had decreased below gale force.

**Atlantic Cold Front 5-6 February:**

A combination of a storm center located well off the New England coast and an associated cold front over the west Atlantic produced an area of gale force winds across the northern portion of the TPC forecast waters. At 0000 UTC 5 February, westerly gale force winds began north of 28N west of 60W. The ship **Choyang Zenith** (DACP) experienced 40 kt winds near 31N 75W early on the 5th. The area of gales spread eastward, and a 1031 UTC Quikscat pass detected west to

northwest winds of 35 to 45 kt north of 27N between 57W and 73W. The ships **Galveston Bay** (WPKD) and **SWIN** confirmed the Quikscat winds by observing 35- to 40-kt winds between 0600 and 1200 UTC 5 February. Early on the 6th, a high pressure ridge built across the western Atlantic from the South Carolina coast east to 28N 60W. By 0600 UTC 6 February, the winds had decreased below gale force south of 31N.

**Atlantic Gale 20-21 February:** A gale center located well north of 31N produced a brief period gale force winds north of 29N between 55W and 60W. On the afternoon of 20 February, the gale center moved southeast and was located near 37N 55W. Two ships near 30N 58W, the **Endeavor** (WAUW) and the

**Endurance** (WAUU) encountered gale force winds and seas of 5.5 to 7 m (18 to 23 ft) at 1800 UTC that day. On 21 February, the gale center weakened as it continued to move southeastward. Winds decreased below gale force by 0600 UTC. However, large swells of 4 to 6 m (14 to 20 ft) continued across portions of the central Atlantic for the next few days.

**West Atlantic Gale and Storm 24-26 February:** At 0000 UTC 23 February, a low formed along the strong cold front mentioned in Section I over the southeast Gulf of Mexico. As the low deepened and moved northeastward across south Florida, winds increased over the eastern Gulf and western Atlantic. By 0000 UTC 24 February, the low became a gale center off the east coast of Florida near 29N 78W

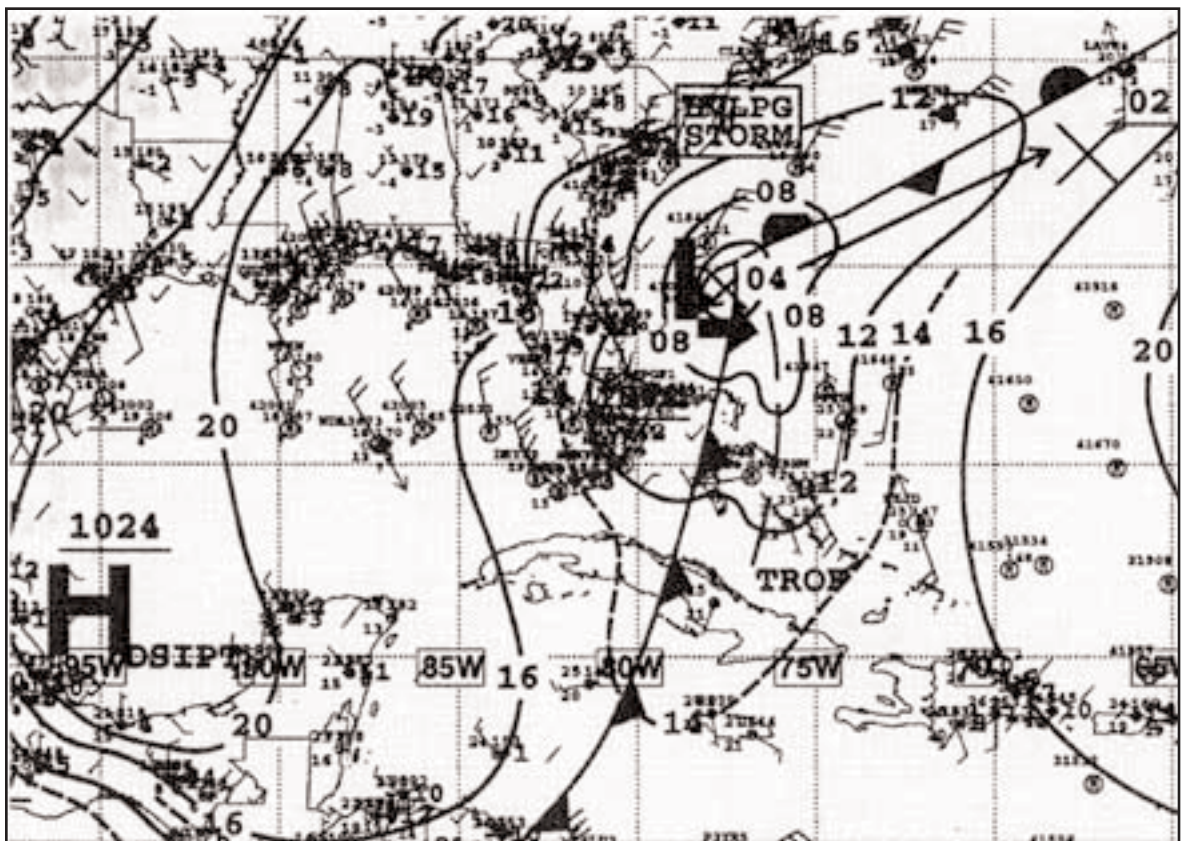


Figure 3. Tropical Analysis and Forecast Branch surface analysis at 0000 UTC 24 February. Solid lines are isobars at 4-mb intervals with intermediate isobars as dashed lines.



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(Figure 3). At this time buoy 41010, located 120 nmi east of Cape Canaveral Florida, reported sustained northerly winds of 35 kt with gusts to 46 kt. Sea heights at the buoy rose to a maximum of 5 to 5.5m (16 ft) around 0600 UTC. The gale center moved northeastward, and a Quikscat pass at 1045 UTC placed the center near 30N 75W. The Quikscat data indicated 35 to 40 kt winds within 240 nmi of the center, mainly over the western semicircle. The **Sealand Hawaii** (KIRF) experienced 40 kt winds at 1800 UTC near 29N 71W. By 0000 UTC 25 February, the gale became a storm near 32N 70E. A Quikscat pass from shortly before 0000 UTC clearly detected both the storm force winds and the circulation center (Figure 4), and the storm force winds remained north of 31N. However, as the storm moved slowly

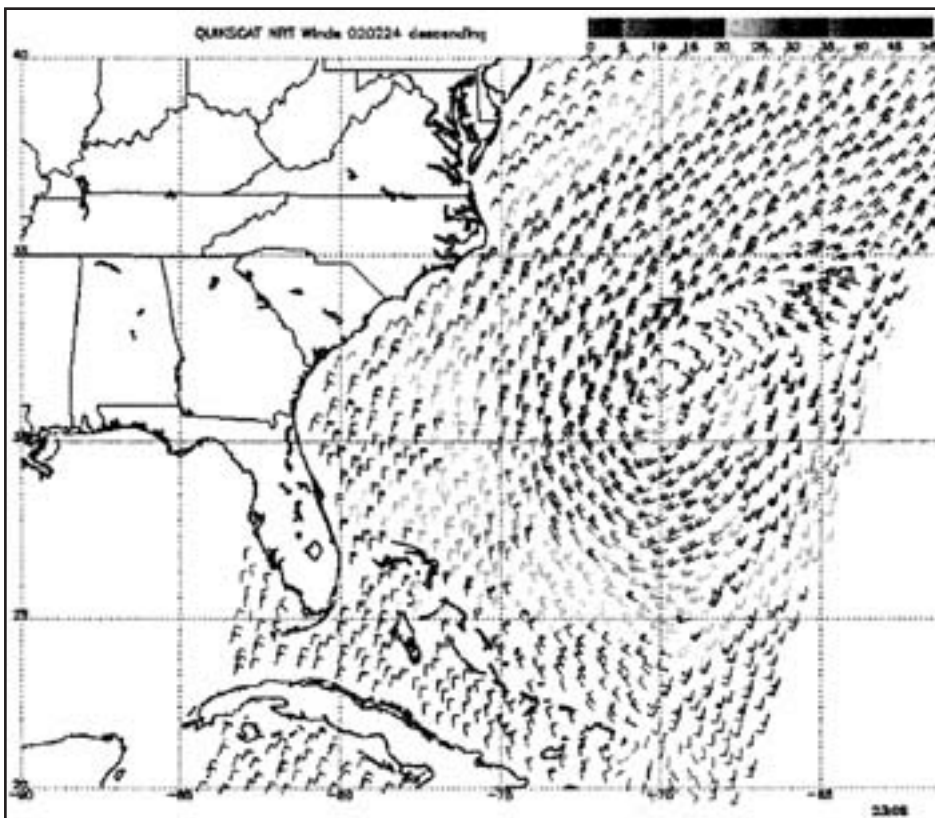
eastward on the 25th, it continued to produced gale force winds north of 28N between 65W and 72W. The storm weakened to a gale by 0000 UTC 26 February, and by 1200 UTC 26 February winds decreased below gale force. The low continued to weaken and drift southward, finally dissipating near 27N 57W on 27 February.

### Gulf of Mexico Gales 26-27

**February and 2-4 March:** The last two western Gulf gale events of the 2002 winter season occurred in late February and early March. The first event began as a cold front moved off the Texas coast shortly before 0600 UTC 26 February. The front was followed by a strong 1045-mb high located over the northern Rockies. Winds over the western Gulf quickly increased behind the front. Both

western Gulf buoys (42002 and 42020) observed northerly winds around 30 kt, with gusts to 38 kt for several hours beginning just after 1200 UTC. Sea heights at buoy 42002 peaked at 4.5 m (15 ft) around 0200 UTC 27 February. During this event, winds were once again the strongest over the extreme southwest Gulf of Mexico. Quikscat data from 2355 UTC detected 30 to 35 kt winds over the southwest Gulf. By 1200 UTC 27 February, the high pressure center moved over eastern Texas and weakened to 1035 mb. By this time, winds over the western Gulf of Mexico had decreased below gale force.

The last strong gale-producing cold front of the winter season moved off the Texas coast around 1500 UTC 2 March. Once again the winds increased very quickly behind the front. At 1800 UTC, buoy 42020 reported northerly winds of 34 kt, with gusts to 42 kt. At 0000 UTC 3 March, the front extended from New Orleans, Louisiana to just south of Tampico, Mexico. At that time, the **Dusseldorf Express** (S6IG) in the extreme northwest Gulf experienced northwest winds of 35 kt. At 1200 UTC, the ship **Celebration** (H3GQ) observed 34 kt winds near 27N 91.5W. Around the same time, buoy 42002 reported 34 kt winds, with gusts to 42 kt. The buoy later recorded a maximum wave height of 5.5 m (18 ft) at 1600 UTC. By 0000 UTC 4 March, the cold front extended from central Florida to the Yucatan Peninsula. At that time winds decreased below gale force, but winds remained northerly at 25 to 30 kt over the eastern Gulf of Mexico until early on 5 March.



**Figure 4. Quikscat data at 2306 UTC, 24 February, 2002.**

*(Image courtesy of National Environmental Satellite, Data, and Information Service)*

### Central Atlantic Gale 3-4 March:





Beginning on 2 March, a tight pressure gradient formed between a strong high pressure ridge over the west Atlantic and a weak stationary front that extended across the central Atlantic from 31N 43W to 20N 55W. The tight pressure gradient produced a large area of strong northeast winds northwest of the front to 65W. By 1200 UTC 3 March, the pressure gradient became strong enough to produce gales over the area north of 25N west of the front to 60W. Several ships in the area, including the **Chiquita Belgie** (C6KD7), the **Kielgracht** (PFJI), and the **Patroit** (KGBQ), encountered 34 to 37 kt winds between 1200 UTC 3 March and 0000 UTC 4 March. The ships observed combined seas of 4 to 6 m (13 to 20 ft). By 1800 UTC 4 March, the stationary front dissipated, while the ridge over the western Atlantic retreated northeastward. At that time, winds decreased below gale force.

**East Atlantic Gale 20-21 March:** A storm center which moved rapidly east-northeastward across the central and east Atlantic between 32N and 36N produced gale force winds over the northeast portion of the TPC forecast area. The gales began around 1200 UTC 20 March over the area north of 28N east of 48W. At 0000 UTC 21 March, the 980-mb storm was centered near 36N 39W. At that time, the ship **Thorkil Maersk** (MSJX8) observed southwest winds of 33 kt near 30N 35W. Quikscat data from 0824 UTC 21 March confirmed the gale force winds by detecting a large area of 35 to 40 kt west to northwest winds. On 21 March, the storm moved farther north-northeastward away from the TPC forecast area. Gale force winds ended south of 31N around 1200 UTC.

Large northerly swells of 4 to 6 m (12 to 18 ft) continued for another couple days over the eastern portion of the TPC forecast area north of 20N east of 60W.

### Eastern Pacific

The eastern North Pacific was affected by twelve Gulf of Tehuantepec gale and storm events, and one gale event that resulted from strong trade winds. The twelve events in the January to April 2002 period far exceeded the number of events in 2000 (6) and 2001 (8). Two of the events reached storm intensity.

The overall synoptic pattern in the January-April period featured a broad, long wave trough over the western and central United States, with frequent surges of polar and arctic air into the Great Plains. These surges were accompanied by strong anticyclones with central pressures exceeding 1040 mb over the southern Rockies. These anticyclones maintained central pressures of 1035 mb or greater into Texas and resulted in significant pressure surges over the western Gulf of Mexico and the Isthmus of Tehuantepec.

**Gulf of Tehuantepec:** The first two Gulf of Tehuantepec events of 2002 occurred close together in the first week of January. The first event began at 0000 UTC 3 January and ended 1800 UTC 4 January. The ship **Cabo Creus** (ZCBQ8) reported north-northeast winds of 40 kt and seas of 3 m (10 ft) at 0000 UTC 3 January while located near 15N 95W. A Quikscat pass at 1200 UTC 4 January indicated northerly winds of 30 to 35 kt.

The second event began at 0600 UTC

6 January and was rather prolonged in nature, extending into 9 January and ending around 1200 UTC. The **Polar Chile** (ELTN6) reported east-northeast winds of 35 kt and seas of 4.5 m (15 ft) at 1800 UTC 6 January while located near 14.5N 96W. In addition, four Quikscat passes confirmed gale force winds over the course of this event. Thirty-five to 40-kt northerly winds were noted on the 0054 UTC 9 January pass.

The third Gulf of Tehuantepec gale event was a marginal event. The event began around 0000 UTC 16 January and lasted only 18 hours. A 1212 UTC 16 January Quikscat pass indicated an area of 30 kt winds just under gale force.

The fourth event commenced 10 days later around 0000 UTC 26 January and lasted until 1200 UTC 27 January. The ship **PBBU** (name unknown) located near 14N 95.5W reported north-northeast winds of 37 kt and seas of 5.5 m (18 ft) at 0000 UTC 26 January. Six hours later, the same ship reported northerly winds of 30 kt and seas of 4 m (13 ft) while located near 13.5N 94.5W. A 2354 UTC 25 January Quikscat pass indicated winds of 35 kt in the Gulf of Tehuantepec.

A total of six Gulf of Tehuantepec gale events were noted during the month of February, more than the combined total of events for February in the years 2000 and 2001. The first event in February began near 0000 UTC 2 February and ended at 1800 UTC 3 February. Quikscat passes at 0000 UTC and 1143 UTC 2 February indicated 40 kt northerly winds. The next event followed a week later, commencing at 0000 UTC 8 February and lasting roughly 36 hours. A 1230



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UTC 8 February Quikscat pass indicated 35- to 40- kt winds in the Gulf of Tehuantepec.

The seventh gale event of the period began at 0600 UTC 11 February and lasted until 1800 UTC 12 February. A 1222 UTC 12 February Quikscat pass indicated 35 kt northerly winds. This was the first of three events which occurred at an interval of 6 days.

The strongest Gulf of Tehuantepec wind event for February, and one of two storm events of the period, began at 0000 UTC 23 February and lasted until 1200 UTC 24 February. The precursor signature, a much stronger than normal pressure surge along the Sierra Madre in Mexico on 22 February, resulted in 80- to 100-kt wind gusts at Veracruz (*See section Southwest Gulf of Mexico Storm Events February, 2002*).

At 1800 UTC 23 February, the ship

**Sunbelt Dixie** (D5BU) reported north-northeast winds of 40 kt while located near 14.5N 95W. Later, a 2338 UTC Quikscat pass (Figure 5) indicated 40- to 50-kt winds in the Gulf of Tehuantepec.

The last gale event for the month began at 0600 UTC 27 February and lasted a little over 30 hours. No Quikscat data was available to verify gale force winds; however, the ship **Maersk Wind** (S6TY) observed 25-kt winds at both 0600 and 1200 UTC 28 February, well south of the Gulf of Tehuantepec. Therefore, it is assumed that gale force winds did occur over the Gulf.

A late season arctic air mass swept into the Gulf of Mexico on 3 March and ushered in the first Gulf of Tehuantepec wind event for March, and the second storm event for the period. The event began at 0600 UTC 4 March and ended around 1200 UTC

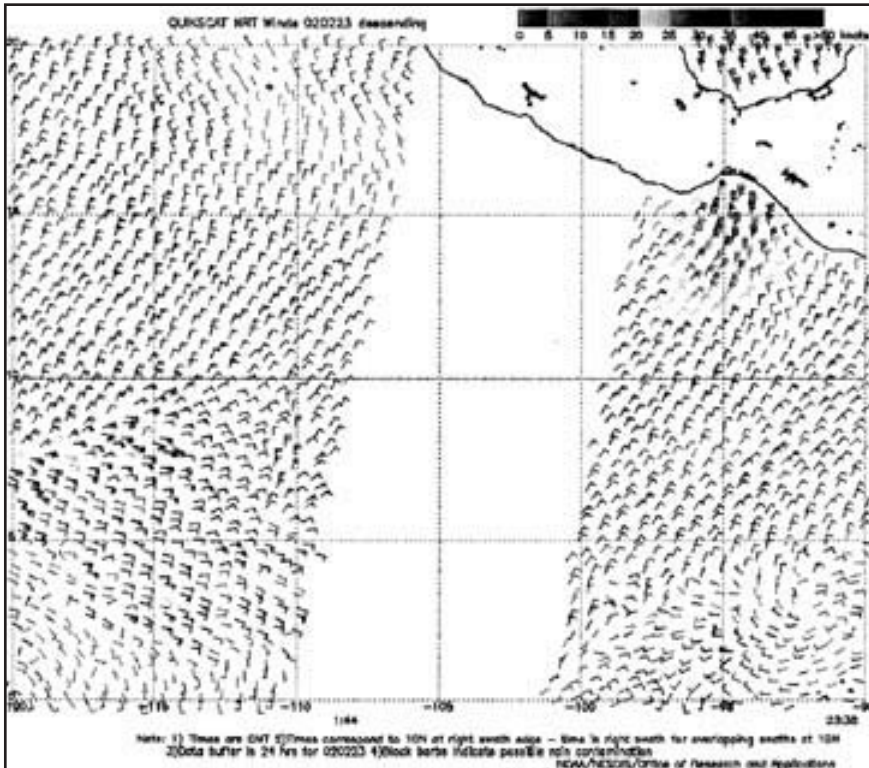
6 March. A 1216 UTC 4 March Quikscat pass (Figure 6) indicated 40- to 50-kt winds in the Gulf of Tehuantepec.

The final gale event of the season began at 0600 UTC 21 March and ended at 0000 UTC 24 March. This was the second of two prolonged gale events, lasting nearly 66 hours. A 2347 UTC 22 March Quikscat pass indicated northerly winds of 35 to 40 kt in the Gulf of Tehuantepec.

**Strong Trade Winds Event 16-19 January:** A strong anticyclone developed over the central Pacific Ocean between 35N and 40N along 140W, with a central pressure near 1040 mb, at 0000 UTC 16 January. Further south, a surface trough was located along 135W between 10N and 20N.

The strong pressure gradient between these features resulted in gale force

Gulf of Tehuantepec Gale and Storm Events (January - April 2002)		
Event	Beginning	End
1	0000 UTC 03 January	1800 UTC 04 January
2	0600 UTC 06 January	1200 UTC 09 January
3	0000 UTC 16 January	1800 UTC 16 January
4	0000 UTC 26 January	1200 UTC 27 January
5	0000 UTC 02 February	1800 UTC 03 February
6	0000 UTC 08 February	1200 UTC 09 February
7	0600 UTC 11 February	1800 UTC 12 February
8	0600 UTC 17 February	1800 UTC 17 February
9	0000 UTC 23 February	1200 UTC 24 February
10	0600 UTC 27 February	1200 UTC 28 February
11	0600 UTC 4 March	1200 UTC 6 March
12	0600 UTC 21 March	0000 UTC 24 March



**Figure 5. (above) Quikscat data at 2338 UTC, 23 February, 2002. Note 50 kt wind barbs in the Gulf of Tehautepec.**  
*(Image courtesy of National Environmental Satellite, Data and Information Service)*

winds beginning 2230 UTC 16 January in an area extending from 20N to 28N, between 130W and 140W. The area of gales lasted over 60 hours, finally ending around 1630 UTC 19 January. A 1008-mb surface low was indicated along the trough for a 12-hour period beginning 1200 UTC 17 January near 17N 135W.

The surface anticyclone gradually moved westward and weakened along 150W by 1200 UTC 19 January, allowing the surface winds to weaken below gale force.

There were several ship reports of gale force winds during this event. Two ships reported gale force winds at 0000 UTC 17 January.

The ship **Chevron Nagasaki**

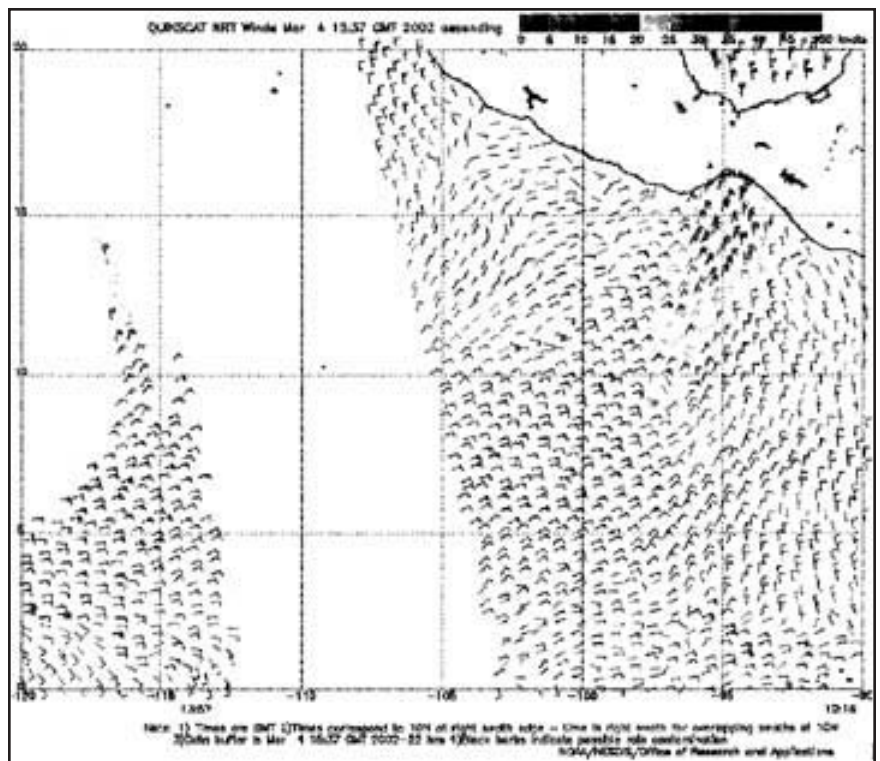
(C6FD8) located near 26N 140W reported east-northeast winds of 36 kt, with seas of 4 m (13 ft).

The ship **Ocean Spirit** (ELK18) reported east-northeast winds of 35 kt and seas of 4 m (13 ft) while located near 26.5N 133W.

The ship **Direct Eagle** (9VRA) reported gale force winds for an 18-hour period between 1800 UTC 18 January and 1200 UTC 19 January while traversing the pacific along 21-22N between 140W and 135W. Seas averaged 5 m (16 ft). ⚓

**Reference**

American Meteorological Society (AMS), "Glossary of Meteorology, Second Edition," 2000.



**Figure 6. Quikscat data at 1216 UTC, 4 March, 2002. Note 50-kt wind barbs in the Gulf of Tehautepec.**  
*(Image courtesy of National Environmental Satellite, Data, and Information Service)*