

Weather observations from bombed battleships' logbooks help scientists understand climate change

September 18 2023

UNITED STATES SHIP PENNSYLVANIA Sunday 7 December, 1941
(Day) (Date) (Month)

ZONE DESCRIPTION Plus 10 1/2

REMARKS

0-4

0000 Resting on keel blocks in #1 dry dock, Navy Yard Pearl Harbor, T.H., receiving fresh and salt water, electricity, compressed air, steam and telephone services from the dock. U.S. Naval vessels present are: BatDivs 1, 2, and 4 less COLORADO; CruDiv 9 less BOISE plus DETROIT, RALEIGH, NEW ORLEANS, SAN FRANCISCO; DesRon 1, 3, 4 plus CHEW and ALLEN; CACHALOT, DOLPHIN, GUDGEON, NARWHAL, LITCHFIELD, PELIAS, ARGONNE, ARCTIC, BOBOLINK, CASTOR, DOBBIN, GREBE, MEDUSA, NIOSHO, RAIL, RAMAPO, RIGEL, TERN, TURKEY, UTAH, VESTAL, VIREO, WHITNEY, SOLACE, PYRO, ONTARIO, KEOSANQUA, SUNNADIN, SACRAMENTO, CROSSBILL, CONDOR, REEDBIRD, P.T. boats #29, 30, and 42. 0125 HAYS, G.D. (Sea2c) returned aboard absent over leave since 0100 this date and was made a PAL by order of the commanding officer. 0127 WHITE, R.L. (MM2c) and HUSKINSON, T.H. (BMkr2c) returned aboard absent over leave since 0100 this date and were made P.A.L.s by order of the commanding officer. 0155 MENDENHALL, P.A. (Cox) returned aboard absent over leave since 0100 this date and was made a PAL by order of the commanding officer. 0158 GAULDIN, R.E. (Sea2c) returned aboard absent over leave since 0100 this date and was made a PAL by order of the commanding officer.

D.S. Wilson
D.S. WILSON,
Ensign, U.S. Navy.

4-8

0745 USS HELM stood out. 0755 Japanese aircraft commenced attacking Ford Island; hangers burst into flame. Simultaneous attacks were made on battleships moored on Ford Island side of channel. Sounded air defense. Manned all battle stations, (General Quarters).

J.D. Eicher
J.D. EICHER,
Ensign, U.S. Naval Reserve.

8-12

Attacks commencing at 0755 consisted of dive bombing on Naval Air Station, Ford Island, T.H. and on ships moored to quays alongside Ford Island and torpedo plane attacks on ships. One torpedo was observed to hit USS OGLALA and one torpedo to hit USS CALIFORNIA, torpedo planes approaching these ships from down entrance channel to Pearl Harbor and turning toward their objectives at close range. This vessel opened fire with ~~main~~ anti-aircraft battery at approximately 0803. Shortly after opening fire, high altitude bombers made approaches and were also taken under fire. Damage, extent and exact time of occurrence unknown, was observed to be inflicted on the following ships by dive bombers, horizontal bombers, and torpedo planes: USS TENNESSEE, USS OKLAHOMA, USS CALIFORNIA, USS OGLALA, USS ARIZONA, USS WEST VIRGINIA, USS SHAW. USS OKLAHOMA and USS OGLALA capsized. At approximately 0907, Bombs from high altitude bombers hit this vessel and USS DOWNES. Fire enveloped both USS CASSIN and USS DOWNES; these ships dry docked ahead of this vessel. The bomb hit on this vessel was made at frame 83, starboard side of boat deck, and believed to be a 500 pound bomb. Casualties occurring from bomb hit are listed below: KILLED: Lieut-Comdr. J.E. CRAIG, USN, Lieut.(jg) R.R. RALL, (MC) USN, AGOLA, M.J. (Sea2c)(USS CHEW), BREKKEN, E.B.(Sea2c), BROWNE, E.A.(GM3c), HAASE, C.F. (Sealc), MARZE (Name obtained from clothing, was wearing GMLC rating), McINTOSH, D.J.(Sealc), RICE, W.H.(GM3c), TOBIN, P.P. (pvt.) USMC, WADE, G.H.(Pvt) USMC, WATSON, C.B.(Sealc), ZACEK, L.J.(F2c - USS TRACY), and two (2) unidentified bodies; WOUNDED: ARNOTT, R.E. (Phm2c), BOARD, W.W.(Pvt.) USMC, BOZEK, W.J. (Pvt.) USMC, CASTLEBERRY, L.O.(Sea2c), COMSTOCK, H.K. (Sealc), CRAIG, S.W.(Mus2c), CRAWFORD, C.C. (Corp) USMC, CURRY, A.E. (Sea2c), DALE, T.J.(PFC) USMC, DILLON, G.J.(Pvt.) USMC, DOMINICI, L.R. (SF3c), DRABEN, W.C. (Pvt.) USMC, EUE, G.A. (Pvt.) USMC, FOWLER, E. (Mattle), FRANCIS, H.B.(PFC) USMC, GORDON, R.A. (Pvt.) USMC, HARGER, H.A.(Sealc), HEATHMAN, L.J. (Matt3c), HOLMAN, N.R. (Pvt.) USMC, HYLAND, E.J.(Sea2c), JOHNSON, F.V.(Sea2c), LAUGHLIN, R.J.(PFC) USMC, MABEY, K.D.(Pvt.) USMC, McFALL, J.H.(Pvt.) USMC, McKENZIE, C.(Sea2c), PACE, J.W.(RM3c), PARKS, A. (Matt3c), RATCLIFF, L., (Matt3c), ROALAND, B.W.(Pvt.) USMC, SANDERS, F.J.(BM2c), SCURLOCK, J.A.(Sealc), STONE, H.F.M.(Sea2c), TROUP, C.C.(Sea2c), TURNER, A.P.(Sea2c), VANDERPOOL, P.L. (F2c), WEBB, W.C.(Sealc), WELLS, A.W.(Pvt.) USMC, WOODS, R.J.(Sea2c); MISSING: BAKER, H.E.(COX), BARRON, T.N.(PFC) USMC, BRAGA, C.R. (Y.2c), JONES, E.B.(Pvt.) USMC, KUEHL, R.K.(Pvt.) USMC, MUHOFSKI, J.A.(RM3c), NATIONS, M.E.(Corp.) USMC, OWENS, J.P. (RM3c), PORTILLO, D.M.(SC1c), QUINN, J.P. (Sealc), SLIFER, M.R.(GMLc), STEWART, F.D.(PFC) USMC, VINCENT, J.C. Jr.(Corp) USMC, and WIEBE, E. Jr.(Sealc). At time unknown USS NEVADA got underway and stood out when she was heavily attacked by dive bombers which scored hits making her unmaneuverable. USS NEVADA drifted until grounding at floating dry dock, and then drifting to grounding at inboard (Cont'd)

Approved: *C.M. Cooke, Jr.*
C.M. COOKE, JR.,
CAPTAIN, U.S. NAVY,
COMMANDING.

Examined: *W.D. Hoover*
W.D. HOOVER,
LT. COMMANDER. *U. S. N., Navigator.*

Ship: USS Pennsylvania. Logbook: 22 December 1941. Credit: University of Reading

Weather data from several ships bombed by Japanese pilots at Pearl Harbor has been recovered in a rescue mission that will help scientists understand how the global climate is changing.

Crew members aboard various vessels—such as the USS Pennsylvania and the USS Tennessee—died when their battleships were targeted in December 1941. Despite these losses, many boats returned to service during the Second World War and US naval servicemen continued their daily duties, which included recording weather data.

A research paper, published in *Geoscience Data Journal*, tells the story of the recovery of World War II [weather data](#) that comes from 19 US Navy ships. Its rescue was made possible thanks to the hard work of over 4,000 volunteers who transcribed more than 28,000 logbook images from the US Navy fleet stationed at Hawai'i from 1941–1945.

Previous studies have suggested these years were abnormally warm. The new dataset, encompassing over 630,000 records with more than 3 million individual observations, will help to show whether this was the case.

Dr. Praveen Teleti, the University of Reading research scientist who led the research, said, "Disruptions to trade routes in World War II led to a significant reduction in marine weather observations. Until recently, records from that time were still only available in classified paper documents. The scanning and rescuing of this data provides a window

into the past, allowing us to understand how the world's climate was behaving during a time of tremendous upheaval.

"There are two sets of people we need to thank for making this mission a success. We are very grateful to the global team of citizen scientists for transcribing these observations and creating a huge dataset that includes millions of entries about air and [sea surface temperatures](#), atmospheric pressure, wind speed, and wind direction.

"The greatest respect must go to the brave servicemen who recorded this data. War was all around them, but they still did their jobs with such professionalism. It is thanks to their dedication and determination that we have these observations 80 years on."

UNITED STATES SHIP TENNESSEE Sun. 7 Dec. 1941
(Day) (Date) (Month)

ZONE DESCRIPTION Plus 10 1/2 REMARKS

0 to 4:

Moored starboard side to interrupted quay Fox-6, Pearl Harbor, T.H., with 9 lines, 2 wire and 7 manila lines. U.S.S. WEST VIRGINIA moored alongside to port side with 7 manila and 1 wire line. Boiler #1 steaming for auxiliary purposes. Ships present - various units of U.S. Pacific Fleet and various yard craft. SOFA is Combatfor in the U.S.S. CALIFORNIA. Combatdiv 2 in this ship.

J.B. Cannon
J.B. CANNON, Ensign, U.S.N.

4 to 8:

0415 The following named men returned to the ship, duties completed as temporary Shore Patrol, Honolulu, T.H: MOYE, W.H., TC1c; SCHRAMB, C.W., WT1c; HUTCHINSON, C., GM2c; OGG, C.W., EM2c; HARVEY, F.G., MM2c; BRADFORD, J.C., SK1c.

J.T. Acuff (for D.M. Kable a casualty)
D.M. KABLE, Ensign, U.S.N.

8 to 24:

About 0755 planes, observed to be Japanese by their markings, were seen dropping bombs on Ford Island. This ship went to general quarters and started setting condition Zed. Immediately after the bombing of Ford Island, planes began torpedoing and bombing the battleships and other ships in the harbor. This ship opened fire with 5"25 caliber, 3"50 caliber, and 50 caliber machine guns about five minutes after the first attack. Orders for sortie were received but later cancelled for battleships. This ship was ready to get underway with both plants and 6 boilers about 0930. Shortly after the attack began the OKLAHOMA, WEST VIRGINIA, and CALIFORNIA received torpedo hits. The OKLAHOMA listed over and in about 10 minutes capsized. The WEST VIRGINIA listed heavily but was righted by counter flooding. The CALIFORNIA listed. The ARIZONA received several large bomb hits at least one of which apparently penetrated the magazines. There was a large explosion forward. The foremast fell forward and burning powder, oil, and debris was thrown on the quarterdeck of the TENNESSEE. The ARIZONA settled rapidly by the bow. The NEVADA got underway but was struck by bombs and torpedoes and grounded in the channel. Large fires were raging around the ARIZONA and WEST VIRGINIA. The ARIZONA was moored to quays about seventy-five feet astern of the TENNESSEE and the WEST VIRGINIA was moored to the TENNESSEE. The burning powder, oil, and debris from the ARIZONA explosion plus the intense heat from the fires started fires in the stern and port quarter of this ship. These fires and the subsequent wetting caused considerable damage to the ward room and officers' quarters in this vicinity. The fires were brought under control about 1030. The Captain returned aboard about 1000 and resumed command. During the engagement the TENNESSEE received two bomb hits, one on turret III and one on the center gun of turret II. The hit on turret III wrecked the high catapult and penetrated the roof of the turret. The bomb broke into large pieces but did not explode. The explosive charge spilled in the turret and burned. Fragments of the bomb strongly indicate that it was a converted 15" armor piercing shell and weighed from 1500 to 2000 pounds. The training gear and rammers were damaged. The range finder was completely wrecked. Several casualties occurred as a result of this hit. Casualties will be listed separately. The hit on turret II split the hoop on the center gun, rendering it inoperative. Fragments from this hit caused casualties on the machine gun stations. The active fighting was over by about 1000 although small numbers of planes were observed and fired at through the day, no more bombs or torpedoes were observed. It is believed that this ship shot down four enemy planes. When fires started in and around the WEST VIRGINIA and ARIZONA, this ship led out all fire hoses and fought fires in the former and the oil fires on the water that endangered this ship. This fire fighting continued throughout the day and night. About 1030 it was decided to try and move the ship forward so as to escape the fires from the badly burning ARIZONA. Both engines went ahead five knots but the ship did not move. It is believed that the WEST VIRGINIA, as a result of her torpedo hits, had wedged the TENNESSEE so close to the quays that she could not move. The engines were kept turning over from five to ten knots throughout the day and night in order that the screw current could wash the burning oil from the stern of the TENNESSEE. During the bombing #3 motor boat was sunk. Number 2 motor launch burned and sank when caught in the oil fire from the ARIZONA. When the fires started magazines number 306, 310, 312 were flooded. At about 1800 fire broke out in the after crane room, caused by heat from fires on the ARIZONA.

Approved: *C.E. Reordan*
C.E. REORDAN,
Captain, U.S.N.,
Commanding.

Examined: *J.T. Acuff*
J.T. ACUFF,
Lieut-Comdr.,

U. S. N., Navigator.

Ship: USS Tennessee BB-43. Logbook: 20 December 1941. Credit: University of Reading

Data from devastated ships

The logbooks used in the project come from 19 different ships, including battleships, aircraft carriers, destroyers, and cruisers, most of which played pivotal roles in World War II events.

Many ships that data was recovered from were present at Pearl Harbor during the attack by Japanese bombers on 7 December 1941, although all ships listed in the study saw action in the Pacific at some point during the war. USS Pennsylvania was hit when Pearl Harbor was attacked by the Japanese air force in December 1941. One bomb fell on the battleship and caused the deaths of nine servicemen, but it remained in service.

The USS Tennessee was bombed twice in December 1941, resulting in the death of five servicemen. It returned to service in February 1942.

Future climate studies

Observations from naval vessels were the primary sources of marine observations for the World War II period but many records were destroyed as an act of war, or simply forgotten due to the length of time they were considered classified.

The recovered dataset reveals how wartime necessitated changes in observation practices. For example, more observations were taken

during daytime than nighttime to reduce exposure to the enemy ships and avoid being detected. It is believed that changes such as this could have led to slightly warmer temperatures being recorded, meaning today's history books show a period of abnormal warmth in global datasets during World War II. The new data will help resolve this uncertainty.

Few or no other digitized observations exist from the Indo-Pacific and Far East during World War II. The rescued data will help scientists correct and fill gaps in existing datasets and ensure they can better understand how [global climate](#) has evolved since the early 20th century.

More information: Digitising weather observations from World War II US naval ship logbooks, *Geoscience Data Journal* (2023). [DOI: 10.1002/GDJ3.222](#). [rmets.onlinelibrary.wiley.com/doi/10.1002/gdj3.222](https://onlinelibrary.wiley.com/doi/10.1002/gdj3.222)

Provided by University of Reading

Citation: Weather observations from bombed battleships' logbooks help scientists understand climate change (2023, September 18) retrieved 27 April 2024 from <https://phys.org/news/2023-09-weather-battleships-logbooks-scientists-climate.html>

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