



Program Objectives: Level 1

The initial Pacific Desk program is intended to prepare experienced weather observers to understand the forecast process, learn fundamental variables and skills required for forecasting, and provide an opportunity for basic hands-on work with meteorological analysis and prediction. The Pacific Desk will prepare trainees to return to their NMHS for further operational forecasting experience.

The Pacific Desk curriculum is largely designed to satisfy WMO BIP-MT General Meteorology requirements (excepting instrumentation), and make initial steps toward mastery of BIP-M requirements, with applications to forecasting in tropical Pacific. *Inherent in all learning objectives, whether explicitly stated or not, is a fundamental or introductory-level mastery.* Some candidates may already be familiar with some introductory meteorology and will have satisfied some listed objectives through the course of their employment prior to the Pacific Desk prerequisite program.

Program Structure

Prerequisites: Approximately 15 hours of online prerequisites, to be completed prior to application for on-site or distance-learning course.

On-Site Program: Four-week course in Hawaii, at the NWS Honolulu Forecast Office on the University of Hawaii-Manoa campus. Trainees to come as a cohort of four to five participants from multiple NMHSes, and the practical instruction will take the characteristics and phenomena of their area of responsibility (AOR) into consideration. Instruction methods will include interactive lectures, hands-on activities, frequent assessments and checks for understanding, participation in forecast office activities, and external site visits.

Distance-Learning Program: Ten-week facilitated online course. Participants can expect an average of 6 hours of self-paced online work per week plus a scheduled 1-hour interactive Zoom session with the instructor. The training content will follow the On-Site Program closely, but in a distance-learning format. Training will combine video instruction, text instruction, hands-on activities, and regular interactive check-ins with the instructor. Participants will need access to an internet-connected computer and a printer. A camera or mobile phone camera is also necessary.

Pacific International Training Desk Syllabus

- **Complementary and Preparatory Subjects (Prerequisites; some optional)**
 - Basic mathematics: algebra, geometry, trigonometry, and statistics
 - Introductory physics: kinematics (2-dimensional, 3-dimensional, and rotational), thermodynamics, behaviors of gases, waves, electromagnetic radiation, and electricity
 - Basic oceanography: general ocean circulation, thermal structure, and waves
 - Basic hydrology
 - Technology and history of meteorology
 - Written and oral communication
 - Basic computational thinking skills and digital literacy
 - Tropical Pacific Ocean geography

- **General atmospheric variables, physics, and dynamics relevant to tropical meteorological operations (Prerequisites)**
 - Atmospheric energy, moisture, and convection
 - Earth's radiation balance; mechanisms of energy exchange
 - Convection and cloud formation
 - Factors affecting convection
 - Atmospheric thermodynamics and stability
 - General circulation and global-scale phenomena
 - Atmospheric composition and structure
 - Global circulation models
 - Semi-permanent cyclones/anticyclones
 - Trade winds and large-scale convergence zones
 - Synoptic and mesoscale phenomena
 - Terrain-induced phenomena
 - Thermal-induced phenomena
 - Local circulations and convergence
 - Thunderstorms and severe weather
 - Data collection and remote sensing
 - Surface and upper-air observations
 - Satellite remote sensing
 - Satellite image interpretation
 - Marine phenomena
 - Ocean energy budget
 - Currents
 - Swell and wave heights
 - Tsunamis
 - Climatology and climatological statistics

- **Tropical weather/climate features and their global role (Prerequisites and On-Site/Distance-Learning)**

- Tropical weather and climate
- Tropical components of the general circulation
- Synoptic and mesoscale tropical phenomena
 - Cyclones/anticyclones/fronts/shearlines
 - Local circulations
- Tropical cyclones
 - Pacific cyclone climatology
 - Structural features
 - Cyclogenesis, life cycle and intensity scales
- Waves and marine forecasting
 - Surface wave generation and swell propagation
 - Statistical methods
 - Wave forecasting resources and interpretation

- **The weather-forecasting process, from analysis to verification (On-Site and Distance-Learning)**

- Sources of weather information
- Meteorological and climatological analysis techniques
- Meteorological diagnosis and feature identification
- Numerical weather prediction
 - Types of numerical models
 - Products of models
 - Use of model analyses and forecasts
- Weather forecasting
 - Forecasters' roles and audiences
 - Types of forecast products
 - Types of predicted variables
 - Forecast methods and best practices
 - Analysis methods
 - Short-range weather forecasts
 - Communicating forecasts to audiences
 - Forecast verification

- **Activities**

- Refresher resources for math and physics
- Self-paced e-learning (e.g. NWS Jetstream Online Weather School, COMET modules)
- Facilitated e-learning (e.g. modules or lessons with live instructor consultation)
- Online discussion forums with fellow trainees and instructor
- Exploration and recording of data and analysis resources
- Online meteorology resource portfolio development
- In-person/small-group instruction tailored to home country where possible
- Examination of case studies and real-time weather
- Feature identification from satellite imagery, surface and upper-air observations
- Practice of meteorological analysis methods (hand-drawn and digital)
- Examination of analysis and forecast products from home and neighboring NMHS
- Atmospheric diagnosis and prediction using model analyses and forecasts
- Short-term forecast practice
- Forecast verification and reflection
- Weather briefing to peers
- Comprehensive final portfolio assessment

- **Experiences (On-Site Program)**

- NOAA-NWS forecaster shift shadowing
- Visits to meteorological observation sites
- Visits to tropical-cyclone forecasting agencies
- Visits to tsunami warning/information centers
- Visits to local media outlets
- NWS Forecast Office map discussions
- University of Hawaii Meteorology Department seminars
- Participation in RA-V teletraining and focus groups
- Communications/emergency-management interface training