



# MAUNAKEA OBSERVATORIES

## VISITORS GUIDE

This guide applies to all visitors touring any of the observatories on Maunakea.

This guide does not apply to visitors who will be performing physical work at the observatory. Additional safety training is required under such circumstances and must be coordinated in advance with a safety specialist.

The **Maunakea Observatories** are a group of independent telescopes in Hawai'i, each owned by various non-profit organizations, and operated by several non-profit universities and research institutions. The Maunakea Observatories includes the California Institute of Technology Submillimeter Observatory ("CSO"), the Canada France Hawai'i Telescope ("CFHT"), the Gemini Observatory ("Gemini"), the NASA Infrared Telescope Facility ("IRTF"), the James Clerk Maxwell Telescope ("JCMT"), National Astronomical Observatory of Japan ("Subaru Telescope"), the Sub-Millimeter Array ("SMA"), the United Kingdom Infrared Telescope ("UKIRT"), the University of Hawai'i 88-inch telescope ("UH88"), the University of Hawai'i at Hilo 36-inch telescope ("Hoku Kea"), the W.M. Keck Observatory, and one receiver of the Very Long Baseline Array (VLBA") (collectively all these telescopes and observatories are referred to as the "MKO").

### Preparation

The summit of Maunakea is 13,796 feet (4,205m) above sea level in a very remote area. It is far from professional medical assistance. The drive to the summit area is over roads that are narrow, winding, unpaved, and subject to weather-related hazards. Being prepared and informed is crucial to a safe and enjoyable visit.

### Medical Alert

Ascent to this altitude exposes one to a reduction in atmospheric pressure, which can result in some discomfort and/or a variety of potentially dangerous medical conditions.

### Persons at Risk:

The following individuals are NOT allowed at Observatories facilities and it is strongly advised that they do not travel above the Visitor Information Station:( VIS)

- Pregnant women;
- Children under the age of 16;
- Individuals with heart, respiratory and other chronic illnesses must not ascend without prior medical clearance from your doctor;
- Individuals who are suffering from upper respiratory infections;
- Scuba divers with less than 24 hours since their last dive.
- Visitors who suffer circulatory condition such as anemia or condition that compromise intake of oxygen.

### Preventing Altitude Sickness:

- Drink plenty of water, or electrolyte based sports drink (no diuretics, i.e. limit coffee intake) before ascending (although caffeine withdrawal can cause headaches);
- Stay hydrated – drink at least 2 cups of water per hour while acclimatizing;
- Keep warm – dress in layers, including closed footwear (required);
- Avoid alcohol, tobacco, and other depressant drugs;
- Avoid heavy meals before the ascent. Eat a light meal or snack that includes carbohydrates before ascending and, keep snacks on hand, eating lightly while at altitude;
- Avoid strenuous exercise or activities while at high altitude. Full acclimatization takes more than one day, so visitors should move slowly and take it easy;

- Pressure breathing may be used to increase oxygen intake (Deep breaths through the mouth and exhaling forcefully through pursed lips). Have someone demonstrate to you how to do this if possible;
- Over-the-counter headache remedies (such as aspirin or ibuprofen) may be effective at relieving mild altitude symptoms.

**Acclimatization is Important:**

Acclimatization at a lower altitude before ascending to the summit is very important. All tours will stop at Hale Pohaku or the VIS. These facilities are at about 9,000 feet (2,800 meters) elevation and are ideal places for acclimatizing before ascending to 13,796 feet (4,205 meters) elevation; this is also where drivers should switch to a 4-wheel drive vehicle. The duration of the stop should be at least ½ hour, 1 hour is recommended for short summit visits. Continue to hydrate your body by drinking more fluids.

Most visitors to the summit area experience some mild altitude symptoms, but for most visitors, the altitude of the mid-level facilities causes minimal problems. Mild high-altitude discomfort includes:

- Headaches
- Dizziness
- Drowsiness
- Irritability
- Altered mental state
- Impaired reason
- Impaired exercise/exertion tolerance

Mild discomfort means that it does not significantly interfere with normal activity. If you experience discomfort, drink fluids and rest until the feelings subside and reconsider ascending. Pay attention to your body.

IF YOU FEEL ANYTHING MORE THAN MILD DISCOMFORT AT THE 9,000 FT. LEVEL, IT IS **STRONGLY** RECOMMENDED THAT YOU DO NOT ASCEND ANY HIGHER.

**Moderate to Severe Altitude Sickness (Pulmonary or Cerebral Edema):**

Although rare, some individuals experience more than mild discomfort at high altitude. Moderate or severe acute altitude sickness could occur (and persist after returning to sea-level). This could be a serious medical problem if you have any of the following symptoms:

- Severe headaches not relieved by medication
- Shortness of breath
- Deep cough
- Nausea and/or vomiting
- Chest tightness or pain
- Loss of coordination or stumbling
- Extreme fatigue
- Loss of consciousness - fainting

**IF SYMPTOMS PERSIST OR BECOME SEVERE, DESCEND IMMEDIATELY, AND SEEK MEDICAL ATTENTION IF SYMPTOMS CONTINUE AFTER DESCENT. IF ON A TOUR, REPORT IT IMMEDIATELY TO YOUR GUIDE, WHO WILL ADMINISTER MEDICAL OXYGEN AND INITIATE YOUR DESCENT TO A LOWER ELEVATION.**

**WEATHER**

During the winter ice regularly forms on the surface of observatory buildings and other structures. As these ice formations melt, large fragments may fall to the ground without warning. Take proper precautions, such as parking away from buildings, weather towers etc., and taking appropriate walking paths to and from building entrances to avoid being injured and/or causing vehicle damage.

Weather can change very rapidly, resulting in severe conditions such as freezing temperatures, snow storms, and winds exceeding 100 mph. "White-outs" caused by blowing snow and fog can block or impair visibility. Road conditions can become hazardous due to deep snow drifts, freezing rain, fog, and ice which prevent vehicle travel. Visitors that are on the summit area when severe weather occurs face a life-threatening situation. Severe weather conditions can last up to a week, preventing an immediate rescue. If you get stuck in a severe winter storm, always stay with your vehicle.

## **EVACUATE THE SUMMIT AS SOON AS HAZARDOUS WEATHER CONDITIONS BEGIN TO OCCUR!**

### **PROPER DRESS**

It's usually cold on top of the mountain, and adequate clothing is required when visiting an observatory:

● Closed-toe shoes	● Gloves
● Warm socks	● Winter hat that covers the ears
● Clothes that cover your whole body. Dress in layers with a warm jacket.	● Sunglasses

### **THE PHYSIOLOGY OF BEING COLD CAN WORSEN THE SYMPTOMS OF HIGH ALTITUDE.**

**UV Radiation:** Because the summit area is above much of the atmosphere that blocks the sun's damaging ultraviolet rays, an individual's risk of exposure to serious sunburn and eye damage is increased, especially if there is snow on the ground. This is easily addressed by wearing UV lenses that block ultraviolet (UV) rays, and by applying sunscreen or covering exposed skin, and using lip balm.

### **DRIVING**

The summit access road (beyond HalePohaku) is approximately eight miles long and includes very steep grades (18%). The lower five miles of the road are unpaved with poor traction, narrow sections, blind curves, and rocks on the road. In some places, there may not be enough room for two-way traffic, especially when large trucks are on the road. Road clearing and maintenance equipment should be given the right-of-way at all times. Stopping distances are greatly increased when there is snow or ice on the road. Drivers should expect to see other vehicles and pedestrians on the road. Drivers should also be careful of bright sunlight in their eyes during the early morning and late afternoon.

Drivers are cautioned to:

- Use 4-wheel drive vehicles on dirt sections of road;
- Check tires and air pressure levels, including the spare tire, and ensure the vehicle is in good working order with basic tools for changing a tire;
- Drivers and passengers must wear their safety belts;
- Drive slowly (Note the speed limit is 25 mph); and 5 mph between SMA & Keck, dirt road.
- Keep a safe distance when following behind other vehicles, if necessary and only pass when safe to do so;
- Always use 4-wheel drive LOW RANGE on the dirt section of the summit access road (to reduce the risk of brake failure and overheating). Use low range on paving areas without 4 wheel drive engaged.

### **SAFETY AT THE TELESCOPE**

The Observatories are working research facilities. Be mindful of work in progress. While inside an observatory, there are some hazards that you should be aware of, to reduce injury, follow these rules:

- Remain with your designated guide at all times;
- Watch your step as there may be uneven flooring or other trip hazards in the observatory;
- Wear a hard hat if instructed by the guide or an observatory staff member. These will be provided to you;
- If an evacuation of the Observatory is necessary, follow the instructions of your tour guide –remain calm.
- Observatory staff will advise you of hazards specific the the observatory you are visiting.
- The use of cellular telephone and other electronic devices which transmit a radio signal are prohibited on the summit to include radio remote controlled devices.

### **REMOTE LOCATION**

Maunakea is a very remote location. There are no public accommodations, food or gasoline services. Observatory buildings are not open to the public without planning. There are limited restroom facilities above the VIS. The only public telephone

above the VIS is an emergency phone at the entrance to the University of Hawai'i 88-inch Telescope. Cellular phone coverage is unreliable on the Hwy 2000/Saddle Road, Maunakea Access Road and on the summit area. Vehicles should be in excellent working condition, especially the brakes, and should contain sufficient fuel to return to Hilo, Kona, or Waimea. Emergency services, including medical assistance, may be two hours away.

**ALL VISITORS ARE RESPONSIBLE FOR THEIR OWN SAFETY  
TRAVEL IS AT YOUR RISK**

Emergencies:	911
Visitor Information Station:	(808) 961-2180
Winter Conditions:	(808) 935-6268 (recording)

**MAUNAKEA RANGERS:** When fully staffed, there are a minimum of two Rangers on duty daily from 7:15 a.m. to 10:00 p.m. (VIS), the standard workday includes 4 two-hour summit patrols. The Rangers have emergency medical responder training and carry oxygen, backboards, Automatic External Defibrillator (AED), splints, and assorted first aid supplies in their vehicles. They are available for assistance in an emergency. However, 911 should still be called immediately and before contacting Rangers for any serious emergency. The Ranger vehicles are clearly marked with "RANGER" on the fenders and an emergency light on the roof.

**RANGER CONTACT: (808) 934-9244** (VIS priority line 8:15a.m. to 10:00p.m.)

The Rangers work closely with the VIS staff and a call to the VIS Priority Phone is the most reliable means of contacting them. The VIS staff will know the cell phone number of the Ranger on summit patrol. Remember, reception for these phones is limited on the summit. If it's between 7:15 and 8:15 a.m., Rangers are available by radio. - Call the dining facility at 935-7606, and they will use their radio to contact a Ranger. Again, do not delay calling 911 for emergencies. Rangers will respond to assist when contact is made.

**Waiver and Release of Liability**

The MKO are located on or about the summit of Maunakea at an altitude of nearly 13,800 feet (4,2000 meters) Because you may be coming to this altitude from sea level, it will expose you to a severe reduction in atmospheric pressure, which can result in a variety of medical conditions associated with altitude sickness. In certain cases, severe illness or even death can result. Anyone in poor health should consult their physician prior to visiting Maunakea. Anyone who is pregnant, suffer from heart or respiratory problems, or under the age of 16 are not permitted to proceed further than the Visitor Information Station at 9,200 feet. Persons who have gone scuba diving should not visit Maunakea within 24 hours after their last dive.

I have been advised that visitors to the telescopes may suffer headaches, tiredness, irritability, insomnia, reduced intellectual capacity, impaired exercise tolerance, and possibly vomiting. It is also possible to develop one of the more severe mountain sickness, pulmonary or cerebral edema, both of which can be fatal. The altitude may also aggravate pre-existing disease, particularly heart and respiratory diseases. I have read the attached document called "MaunaKea Visitors Guide" which contains information regarding the various hazards of visiting Maunakea. I have been advised to read the Guide and understand the hazards.

The MKO strongly recommended that I bring the above information to the attention of my medical practitioner prior to visiting Maunakea, and seek appropriate medical advice and clearance. It has also been recommended that if I have a pre-existing condition which could be affected by altitude, that I bring this to the attention of my MKO host so that s/he is better able to assist me in case of a medical emergency.

I agree to follow directions of any host, site personnel, and conduct myself in a safe manner, observe safety requirements at all times during the visit or activity, and immediately advise my host or site personnel of any adverse effects experienced at high-altitude.

By signing this Waiver and Release of Liability, I agree that I am aware of the risks associated with traveling to and from the summit of Maunakea, as well as participating in any activity there upon, which may include, but are not limited to,

property damage, physical or psychological injury, pain, suffering, illness, disfigurement, temporary or permanent disability (including paralysis), economic or emotional loss, and death. I understand that these injuries or outcomes may arise from my own or others' negligence, conditions related to travel, or the condition of the activity location(s). Nonetheless, I assume all related risks, both known and unknown to me, arising out of or relating to my participation in the activity, including travel to, from and during the visit or activity.

I hereby, for myself, my heirs, executors, administrators, assigns, or personal representatives, hereby waive, release, indemnify and agree not to sue MKO and its officers, directors, managers, members, employees, agents, attorneys, staff, volunteers, contractors, heirs, representatives, predecessors, successors and assigns, and all other persons acting by, through or in concert with any of them (collectively, "Released Parties"), from and against any and all rights, claims, damages, liabilities, losses, demands judgments, awards, costs and expenses, including attorneys' fees (collectively, "Claims"), of any kind whatsoever, arising out of my visit or participation in the activity, including traveling to and from the activity. I further release all Released Parties from any and all Claims on account of any first aid or medical treatment including but not limited to Oxygen therapy or service rendered in connection with my participation in the activity.

In the event that any provision contained within this agreement shall be deemed to be invalid, unlawful or otherwise unenforceable, the remainder of this agreement shall remain in full force and effect. This agreement shall be governed by and construed in accordance with the laws of the State of Hawai'i.

