

VOCALS Site Survey

30 September – 12 October 2007

Arica, Iquique, Santiago, Chile

Brigitte Baeuerle, Henry Boynton, Bob Hannigan, José Meitín, Vidal Salazar, Rob Wood, Pete Daum, Juan Aravena



GENERAL INFORMATION:

Area	756,950 sq. km
Population:	16,284,741 (2007 estimate)
Government Type	Republic
President	Michelle Bachelet Jeria
Capital City	Santiago
GDP per capita	\$12,600
Unemployment Rate	7.8%
Life expectancy	77 years
Infant Mortality Rate	8.36 death / 1000 life births
Currency unit	Peso
Highest point	22,572 ft (Nevado Ojos del Salado)
Main cities	Concepción, Viña del Mar, Valparaiso
National Holiday	Independence Day, 18 September

OVERVIEW



Chile is unique for its very long (2,650 miles) and comparatively narrow (maximum 250 miles) shape and for its great variety of natural features. It extends from latitudes 18 to 56 degrees south and contains one of the driest regions in the world and one of the wettest areas in South America. It is bound on the north by Peru, on the northeast by Bolivia, on its long eastern border (3,200 miles) by Argentina and on the west by the Pacific Ocean. In its economy and public services, Chile is one of the most developed countries in the Andean region.

Climate: Extending over 38 degrees of latitude, from the tropics to the vicinity of Antarctica, and from sea level to altitudes of over 20,000 feet, Chile has a wide variety of climatic conditions. Extreme aridity prevails over the northern part of the country; the average annual rainfall in this region is 0.04 inches. Temperatures are moderate along the coast throughout the year and more extreme inland, especially in the central basin. The average temperatures for the hottest (February) and coldest (July) months are 72°F and 60°F.

Central Chile (30-40 degrees latitude) has a Mediterranean type of climate, with cool and rainy winters (April to September) but without a completely dry season. Average annual precipitation increases substantially and temperatures decrease toward the south. The average temperatures for the hottest (January) and coldest (July) months at Santiago are 68° F and 46.6°F, respectively. The average annual precipitation at Santiago is approximately 15 inches.

The climate of the southern region is cool and rainy the year round. It is characterized by abundant low clouds. The average temperature for the warmest (January) and the coldest (July) months are 57°F and 40°F respectively. The average annual precipitation is 119

inches. The changes of the snow line on the westward-facing slopes of the Andes can serve as an indication of the variation in climatic conditions with latitude and altitude. The line of permanent snow is approximately 18,000 feet in Chile's extreme north. It descends to 14,000 feet opposite Santiago and to 2,200 feet at Tierra del Fuego.

Time: Mainland is GMT 5 (GMT 4 from the second Sunday in October (Oct 12, 2008) to the second Saturday in March). Easter Island is GMT 7 (GMT 6 from the second Sunday in October to the second Saturday in March).



Electricity: Electrical current is 220 volts, 50Hz. Round two-pin (Type C) plugs are standard.

Language: The official language is Spanish.

Health: There are no vaccination requirements for entry to Chile, but Hepatitis A immunization is recommended. No problems were experienced with drinking water, although several travel sites recommended that all water should be treated as if contaminated; bottled water is available. Santiago experiences severe air pollution, which could cause respiratory problems or eye irritations. Travelers visiting the Andes Mountains should be aware of altitude sickness, and if possible ascend slowly to allow the body to adjust. Health care in urban areas is good, but hospitals and clinics are expensive and usually require payment in cash, health insurance is therefore strongly recommended. According to Embassy personnel, Santiago has excellent health facilities.

Money: The local currency is the Chilean Peso (CLP), which is divided into 100 centavos. Visa, Mastercard, Diners Club and to a lesser extent, American Express, are accepted in most large shops and hotels. Travelers checks, particularly in US Dollars, are welcome in major towns, where there are banks and *cambios* offering currency exchange services. ATMs are widely available, make sure to push the "Foreign Client" button. Currency Exchange Rates: 1000 pesos = US\$ 1.90

Tipping: Tips of 10% is expected in restaurants. It is not customary to tip taxi drivers but it is usual to round up the fare if they help with luggage. In general tipping small amounts is customary for all services.

Safety: Chile is a politically stable country with very few threats to the traveler. Incidences of pick pocketing and mugging are on the increase and travelers should take care of their belongings, especially around tourist areas and bus stations, and avoid walking alone late at night. Chile has a landmine problem, mainly restricted to border areas adjacent to Peru, Bolivia, and Argentina. Natural hazards in Chile include severe earthquakes, volcanic eruptions and tsunamis.

Customs: Bargaining is not practiced in street markets or stores. It is considered polite for smokers to offer cigarettes to travel companions before lighting up themselves.

Business including Dress Code: Chilean business culture tends to be formal, and this

includes dress, which should also be conservative in color and style. Third party introductions are often necessary to preparing a meeting, and developing a personal relationship is key to success; a social aspect is essential before getting down to business. Chileans stand very close when conversing and it is rude to pull away. Visitors are also expected to re-confirm appointments before arriving at a meeting. Foreigners should be on time for meetings, but it is not unusual for the host to be 15-30 minutes late. On introduction, a firm handshake and the exchange of business cards are usual and care should be taken to pay attention to the card before putting it away carefully. Business hours are generally 9am to 5pm Monday to Friday, with a two-hour siesta over lunch.

Phones: The international access code for Chile is +56. The outgoing code is 00 followed by the relevant country code (e.g., 001 for the US). The area code for Santiago is (0)2, for Arica 58 and for Iquique 57. Internet cafes are available in the main towns. A number of telephone companies offer different rates for national and international calls, depending on the time of day. Public phones are widely available and international call centers are available in most shopping malls. Mobile phone companies have roaming agreements with most international cell phone companies; otherwise mobile phones can easily be rented. A GSM network is in operation. Internet cafes are widespread, particularly in the big cities.

Phones can be rented at the Santiago Airport on the first floor through **Entel PCS Aeropuerto**. The rental of the phone and incoming calls are free, domestic calls were 400 pesos per minute and international calls were 950 pesos per minute. Loss of the actual phone will cost \$100. The phone has to be returned to Entel on the third level next to the international departures gate. Additional help is available through 02 3688778.

Dialing instructions for the cell phone were as follows:

To call abroad: 1230 – country code – area code – number

To call within Chile (land line) – 0 – area code – number (e.g., Santiago 0 2 phone)

To call a mobile phone either 9xxxxx, 8xxxxx, 7xxxx

For those with unlocked GSM phones, a SIM card can be purchased at the airport for 20,000 pesos and comes with 20,000 pesos worth of phone air time.

TRAVEL

Entry requirements for Americans: A passport is required for travel to Chile. No visa is required by US nationals for visits of up to 90 days. Passengers must hold a Tourist Card (issued free of charge on arrival for 90 days) and sufficient funds to cover intended period of stay. A return or onward ticket is not required if holding a credit card or sufficient funds to purchase a ticket. Passengers with a passport from Australia, Canada, United States or Mexico are required to pay a reciprocity tax on entering the Santiago airport before passing through Customs. Fees are US\$56 for Australians, US\$132 for Canadians, US\$100 for US nationals and US\$15 for Mexican passport holders. This tax

must be paid in US dollars cash or credit card; it is paid once and remains valid until the passport expires (for Canadians and Americans) or for three months (for Mexicans and Australians). The fee has to be paid **prior to** clearing immigration (international police).

Santiago Arturo Merino Benitez International Airport (SCL)



Most international flights from the USA will arrive in the early morning hours. Connections to Iquique and Arica do not leave until late afternoon, which makes for a very long day at the airport. Travelers are advised to rent a room at one of the local airport hotels to get some rest before continuing their travel.

Connections in Santiago onto the LAN Chile flights are handled on the third floor. Luggage can be checked early but can also be put in storage on the first floor. Bags will cost between \$5 and \$10 US depending on the size of the bag.

Location: The airport is situated 13 miles (21km) north west of Santiago. **Time:** Local time is GMT -5 (GMT -4 from the second Sunday in October (Oct 12, 2008) to the second Saturday in March). **Contacts:** Tel: +56 (0)2 690 1752/3. **Transfer to the city:** Several bus services leave regularly for the city centre. Official airport taxis are also available from outside international and domestic arrivals. **Car rental:** International companies such as Avis and Alamo are represented at the airport as well as several local companies. **Facilities:** Facilities at this extremely well equipped airport include Business and Internet Centres, bureaux de change, banks and ATMs, duty-free shops as well as a variety of other retail stores, restaurants, cafes and bars, a post office, tourist information, travel agencies and hotel reservations. There are also plenty of children's play areas available. **Parking:** Parking is available 24-hours a day. **Website:** www.aeropuertosingo.cl

For internal flights, it is important to make sure that the flight schedule has not changed. It is also useful to reconfirm your airline ticket the day before. There is a baggage limitation for domestic flights which does not apply to international connections, but which needs to be pointed out. Luggage allowance is 2 bags, 23 kg each. Each additional kg is 3000 pesos.

Lan Chile: <http://plane.lan.com/index-es-cl.html>

ARICA

Arica is a port city in northern Chile, located only 18 km (11 miles) south of the border with Peru. Arica is also known as one of the driest inhabited places on Earth, at least as measured by rainfall: average annual precipitation is 0.76 mm (0.03 inches). Despite the lack of vegetation, its tropical latitude, dry climate and the city's beaches have made Arica a popular tourist destination. Economically, it is an important port for Chilean ore, and it is also a center of rail communication with Bolivia. Arica has strong ties with the city of Tacna, Peru; many people cross the border daily to travel between the cities, partly because many services are cheaper on the Peruvian side. Arica is connected to Tacna and to La Paz, Bolivia by separate railroad lines.



Arica spreads out at the foot of El Morro Hill, the site of a major battle of the Peruvian War (1879-83). Today, the hill is a national historic monument, complete with an open-air museum. The summit of El Morro affords excellent panoramic views, which survey the city, the ocean, and even the distant Atacama. Between El Morro and the Rio San Jose, the city center is a slightly irregular grid. The main shopping street, 21 de Mayo, is a pedestrian mall running between Prat and Baquedano. At the foot of El Morro are the gardens of Plaza Colon, from which Avenida Comandante San Martin snakes west and south towards the city's most popular beaches. In the other direction, Avenida Maximo Lira swerves sharply at sprawling Parque Brasil to become Avenida General Velásquez, leading to the Panamericana Norte and the Peruvian border, some 20 km to the north.

Near the city is the Azapa Valley, an oasis where vegetables and Azapa olives are grown.

ARICA AIRPORT - Aeropuerto Internacional Chacalluta is 18 km north of Arica, near the Peruvian border. The Chacalluta Airport has 24 hour services, customs/immigrations are available. The airport has only ten operations per day, with busy times from 10am to 2pm and 7pm to 4am, so interference with commercial traffic will not be a problem. No problems are expected with respect to night operations.

Dirección General de Aeronáutica Civil - Chile

Chacalluta Airport Manager (DGAC)

Julio Schnettler

(+56) (58) 211 128

(+56) 09 158 1710 mobile

ad.arica@dgac.cl

FBO: There is no Fixed Based Operator (FBO) located at the airport, so either LAN Chile or Sky Airlines will have to be approached for any services required. LAN Chile is the larger of the two operators and offers ground support to 3rd parties, therefore preferable. Aircraft operators need to request services required from LAN (Santiago) headquarters to see if they can accommodate our operations and receive a price quote for operations at the airport.

Gases: LAN Chile stated that they have nitrogen and oxygen service equipment at the airport; lavatory service equipment was also available. While LAN Chile has two ground power carts, NCAR plans on shipping all their own ground support equipment. No dry ice is available in town and will have to be flown in from Antofagasta.

Parking for the four aircraft at the Chacalluta Airport is possible with the C-130 parked on the southern end of the taxiway, and the other three aircraft parked in a row on the south end of the apron area. The apron area is 100 x 200 meters. The C-130 crews will be able to drive to the C-130 location for pre-flight and maintenance tasks, however the airport people pointed out that the surrounding area was mined and off-road driving is not advisable. Personnel driving on the airport will have to attend training that will be provided by the airport.

Operations: Operations on the airport apron and taxiways will be controlled by the airport tower, so some sort of communications will have to be set up (telephone or radio). All takeoffs to the north from the airport will enter Peruvian airspace, which needs to be coordinated by Air Traffic Control. Applications for clearances for the project will have to include requests for overflight and landing permission from Peru; permission to use airports in Peru for an alternate landing location is also advisable.

Fueling: The airport has plenty of fuel, but the supply at the airport will have to be well coordinated due to fuel storage at the airport. The three aircraft parked on the apron could possibly be fueled from the fuel pits without being relocated. The C-130 would have to be taxied to the fuel pits prior to each flight since there are no fueling trucks available. This would add at least one hour to the crew duty day and require approximately an additional hour of the C-130 APU operation time.



Space: There are no buildings available that could serve as temporary lab, operations and storage space. Arrangements for trailers, chemical toilets, and electricity will have to be made but are available in town. Trailers are available from SAAM (Sudamericana Agencias Aereas Y Maritimas SA), which has an office in town (Ave Santa María), near the Arica Building Supply Center (“Home Depot” clone). The contact is Claudio Sepulveda C. (211123, 215419)
General Phone: 600 600 7226
Fax 56 32 201481
www.saamsa.com
Email: servicioalcliente@saamsa.com,

Chemical toilets are available from Disal Chile (09 9599 9131)

Security: The airport will have to take care of security.

Transportation and Rental Cars: Flight crews will need their own transportation to and from the airport. Arrangements with rental agencies will have to be made early to make sure that enough rental cars are available for project personnel. Taxis are only available when commercial aircraft is coming in or going out. A cab ride to the hotel is about \$7,000 pesos one way for three people.

To rent a car in Chile, the driver has to be 21 years or older, has to have a valid drivers license, and a credit card. We were able to rent a car without an international drivers license but it may be worthwhile to have one on hand. Rental car companies in town included

- Avis - Chacabuco 314; phone 58 4820; Chacalluta 58 215305
- Budget – Colon 996; phone 58 258911, 58 215305
- Hertz – Baquedano 999; phone 58 23 1487
- Klasse – Velasquez 762; phone 58 25 2954, 58 254498

Prices were quoted as follows:

KLASSE

Model	Per day	Per km	Unlimited km
Hyundai Accent	9,000	80	21,000
Daewoo Lanos	18,000	150	25,000
Daewoo Heaven	13,000	100	23,000
Ford Ranger	20,000	150	39,500
Suzuki Jeep	15,000	150	37,500
Toyota HILUX	25,000	170	45,000
Nissan D22	25,000	170	45,000

BUDGET

www.budget.cl

Model	Daily Rate	Weekly Rate	
D3 / Suzuki Jimny	52,945	312,124	4 people
I1 / Nissan Terrano	55,325	328,785	5 people, open truck
I3 / Nissan Terrano	67,785	400,618	5 people, open truck
F2 / Hyundai Minibus	70,390	414,990	12 people
J1 / Mitsubishi L200	81,801	94,290	5 people, open truck
J3 / Mitsubishi L200	99,457	590,451	5 people, open truck

ACCOMMODATIONS:



(1) Panamericana Hotel – Arica Inn and Resort

Av. Comandante San Martin 599

Arica, Chile

Phone: 56 58 254 540

Fax: 56 58 231 133

reservas@hotelarica.cl (Pamela)

<http://www.panamericanahotels.cl/hotelarica.htm>

The hotel is located south of town right next to the beach about 30 minutes from the airport. The hotel is rated as a 3 Star hotel and has 114 room (14 suites, 80 rooms of

various sizes, 20 cabanas) distributed over two floors. The size and quality of the rooms varies, the décor is somewhat outdated, but overall the rooms are clean and well maintained. Some of the rooms were on the noisy side, especially those near the staircase. Hot water was also not always available.

The hotel has a conference room for up to 400 people, which can be separated by a room divider. Right next to the conference rooms is a very pleasant, spacious lounge, surrounded by glass windows overlooking the ocean. WiFi is available all through the hotel, even outside near the swimming pool and the bandwidth seems fine.

The food is excellent and is served in the restaurant as well as the bar. The breakfast buffet was open from 6 am to 9:30 am and was included in the cost.

The hotel has a swimming pool, tennis courts, a rather non-impressive exercise room and a golf course nearby.

Other amenities include cable TV (but no English channels), a mini bar, room service, safe-deposit box; free parking, courtesy transportation; a business center and laundry service.

Cost per night for a single room was \$86. Negotiations for a reduced rate will be done once the final VOCALS project location is determined.



(2) HOTEL EL PASO PARK

General Velásquez 1109

Arica, Chile

Phone: 58 230 808

Fax: 58 231 965

This 4-Star Hotel in the center of town right next to Arica's casino and the University of Tarapaca has 81 rooms. Twenty-four of those are brand new, with tasteful décor, new furniture, all facing the swimming pool. However, the remaining rooms were dark, somewhat shabby and especially the bathrooms showed their age and use. The hotel is about 15 minutes from the airport.

WiFi is available throughout the hotel. Other amenities include courtesy transportation; a business center, a 24-hour front desk, safe-deposit boxes, hair salon, child care, an exercise room on the premises; minibar; Non-smoking rooms; parking; radios; a restaurant on the premises; swimming pool and a tennis court nearby.

The hotel also has two conference rooms for 150 to 200 people each.

Price: single 30,000 pesos; double: 39,000 pesos; negotiations for a reduced rate will be done once the final VOCALS project location is determined.

Note: Hotels do not charge taxes for foreigners.

UNIVERSITY OF TARAPACA



We met with three staff from the chemistry and physics department of the University of Tarapacá in Arica, which is located near the Hotel El Paso Park in downtown Arica. There was very strong interest in collaborating and a special interest from the Chilean site in potential O₃ measurements. Lab space to prepare solutions and mix chemicals will be available in the Chemistry Department.

Students from the university may also be available to help.

Lorena Cornejo Ponce

Departamento de Química
Laboratorio de Fluorescencia RX
Facultad de Ciencias
Universidad de Tarapacá
Avada. General Velasquez 1775
Arica Chile
56 58 205413
56 58 205406
lorenac@uta.cl

Miguel Rivas Ávila

Departamento de Física
Facultad de Ciencias
Universidad de Tarapacá
Avada. General Velasquez 1775
Arica Chile
56 58 205438
mrivas@uta.cl

COURIER SERVICES

Both DHL and FedEx services are available in Arica. The DHL office is on Av. Cristobal Colón 351, phone 25 6753.

MEDICAL SERVICES

Clinica Arica: Av. Argentina 2249, <http://www.clinicaarica.cl>, 24-hour service
Clinica San Jose, Juan Noe 1370, 253 911 / 231 414, 24-hour service

OTHER SERVICES:

Office Trailers: SAAM, near the Arica Building Supply Center (“Home Depot” clone) –
phone: 600 600 7226, www.saamsa.com, servicioalcliente@saamsa.com

POTENTIAL LOCAL HELP:

Alfredo Araya Aguirre
Ingeniero Comercial
Valle de Azapa Km 1 ½
Phone: 227545, 9 487603
Casilla 1481
alfredoaraya@starmedia.com

HISTORY OF ARICA

The site of Arica was inhabited by different native groups since at least ten thousand years ago, as archaeology has indicated. It was founded by Spanish captain Lucas Martinez de Begazo in 1541, and in 1570 this city was entitled as "La Muy Ilustre y Real Ciudad San Marcos de Arica" (the very illustrious and royal city of San Marcos of Arica). This city was since 1545 the port for exporting the silver of Potosí. Since June 7, 1880, the city has belonged to Chile, and currently it is the capital of the recently created Arica-Parinacota Region (October 2007). It has a population of approximately 200,000 and is known as the "city of the eternal spring". The city was part of Peru until 1880, when it was taken by Chilean forces during the War of the Pacific. Arica was the scene of the taking of the *Morro de Arica* ("Arica Cape"), one of the war's most famous actions. It was the last bulwark of defense for the Peruvian troops who garrisoned the city. The Morro was assaulted and captured on June 7, 1880 by Chilean troops in the last part of their *Campaña del Desierto* (Desert Campaign) during the War of the Pacific.

In 1855 the Peruvian government inaugurated the train Arica-Tacna (53 km long), one of the first in Latin America. The rail line still functions.

TOURIST ATTRACTIONS

El Morro de Arica: Overlooking the city, with outstanding views of the port and the Pacific, the 110 m hill known as El Morro is a historical monument with an open air museum (Museo Historico y de Armas). It commemorates a crucial battle between Chilean and Peruvian forces on 7 June 1880, about a year into the War of the Pacific. It is accessible by car or by a footpath from the south end of Calle Colon.

Iglesia San Marcos: Build by Alexandre Gustave Eiffel, this church was built in 1875 and is located near the Plaza Colon. Originally intended for the bathing resort of Ancon, north of Lima, the Gothic style building replaced a church that was destroyed by an earthquake in 1868.



Aduana: Another Eiffel monument, the former Customs House built in 1874. Though it once fronted on the harbor, a century of landfill has left it about 200 m inland, facing Parque General Baquedano. Restored as the city's *Casa de la Cultura*, it displays historical photographs and occasional art exhibitions on the 2nd floor, reached by a 32 step wrought iron spiral staircase.

Estación Ferrocarril Arica-La Páz: On the north side of the Plazoleta is the old Arica Railway station which houses a small museum. A 1924 German locomotive that pulled trains on the Arica-La Páz line stands in the Plazoleta Estación at the corner of 21 de Mayo and Pedro Montt.

San Miguel of Azapa Archeological Museum: The museum is located 12 km from Arica in the Azapa Valley. The museum was built around an existing 18th century Spanish colonial mill and oil press. It currently houses three exhibits pertaining to prehistoric Arica. One of the permanent exhibits is the chronological sequence of the region's cultural processes. The museum contains early evidence of cultures, which data back 10,000 years. Most interesting is the collection of the oldest known mummies in the world. The Chinchorro mummies are indicative of the complex techniques that were used to prepare the dead.

www.uta.cl/masma

56 58 205555

56 58 205552

museo@uta.cl

Museum hours: 1 March to 31 December 10 am to 6 pm

Admission: \$1,000 pesos



Museo del Mar (Sea Museum) <http://www.museodelmardearica.cl/>

This museum has a collection of conches and shells from different parts of Chile and all over the world.

Pasaje Sangra 315

Arica Chile

251676

Admission fee: 1000 pesos

Geoglyphs of Chiza < <http://www.atacamaphoto.com/atacama-art/atacama-art04.htm> >

Along the Panamericana near Arica, several geoglyphs can be seen from the road.

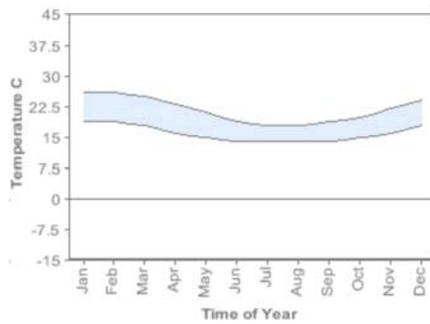
Nature Tours: Several tour companies offer 1 to 6 day tours into northern Chile. Arica is the gateway to archaeological and natural wonders in Lauca National Park, the geoglyphs at Putre, the high altitude Lake Chungara, Las Vicuñas National Reservoir, Salar de Surire Lake near the Bolivian border, Isluga Volcano and other spectacular places in the Andes.

IQUIQUE

Iquique is the northernmost major trade port in Chile, the capital of the Región de Tarapacá: the sole Duty Free province in Chile. It's a curious collection of blocky soviet-inspired housing, the occasional imposing western European edifices and a sprinkling of high raise condominiums, the halcyon days of the 19th-century nitrate mining boom have given the town a wealth of Georgian-style architecture, and it's now becoming Chile's premier beach resort. The last time it rained was



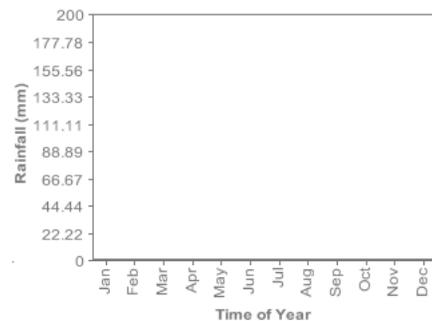
in 1992, or was it 1998? - Locals can discuss such historical markers for hours. It hugs the abrupt scarp of the cordillera along a narrow strip of low coastal land, in permanent threat of complete devastation if an (even moderate) downpour washed down the literally millions of tones of unconsolidated sediment hanging precipitously on the slopes of the Cordillera. Barefoot surfers, paragliding pros, casino snobs and manic merchants all cross paths in this rather disarming city.



On the western edge of the Atacama Desert, Iquique is dry and mild year-round. November to March is the peak tourist season, though there is little variation in average summer and winter temperatures. Surfing and body-boarding is best in winter, when swells come from the north, but it is good all year.

The Atacama is the most perfect of deserts - some coastal stations have never

recorded measurable rainfall. However, infrequent El Niño events can bring brief, but phenomenal, downpours in other places. Temperatures are steady and mild throughout the year in Iquique, though just a few degrees warmer in the summer months (December to March), at around 24°C (75°F).



The lifeless pampas around Iquique are peppered with the geoglyphs of ancient indigenous groups. The shelf where the city now lies was frequented by the coastal Chango peoples who fished from inflatable sealskin canoes and hunted guanaco here in Pre-Columbian times. However, the Iquique area was first put on the map during the colonial era, when the bonanza Huantajaya silver mine was discovered.

During the 19th century, narrow-gauge railways shipped minerals and nitrates through Iquique. Mining barons built opulent mansions, piped in water from the distant cordillera (mountain range) and imported topsoil for lavish gardens. The 19th-century nitrate boom is reflected in downtown Iquique, and the corroding shells of nearby ghost towns, such as Humberstone and Santa Laura, whisper of the source of this wealth. Although Iquique's prosperity faded with the decline in the nitrate boom, it has reinvented itself as a resort

city with beach developments, a glitzy casino and a duty-free megazone. It's also growing as a commercial port and banking center. Still, the 19th-century Georgian architecture gives it an air of history and, in 2001, Iquique was named the cultural capital of the Americas. In 2005, an earthquake measuring 7.9 on the Richter scale, centered roughly 115km (69mi) northeast of Iquique, shook the city. The region was declared a disaster area but ongoing recovery has been swift.

IQUIQUE AIRPORT - The main airport is Diego Aracena International Airport. The international airport operates 24/7 and has regular service from Santiago (2.5h) several times a day. Service from other parts of Chile (like Arica (40min) and Antofagasta (45 min)) operates a couple of times a day. Iquique is a mixed-use airport with a major military air base with more than 100 operations per day in addition to the 24+ commercial flight operations. Customs and immigrations are available on site.

Dirección General de Aeronáutica Civil Chile

Héctor Carrera Ponce de León (DGAC)

Manager- Aeropuerto Diego Aracena

Iquique, Chile

Phone: +56 57 410 787

Fax: +56 57 420 037

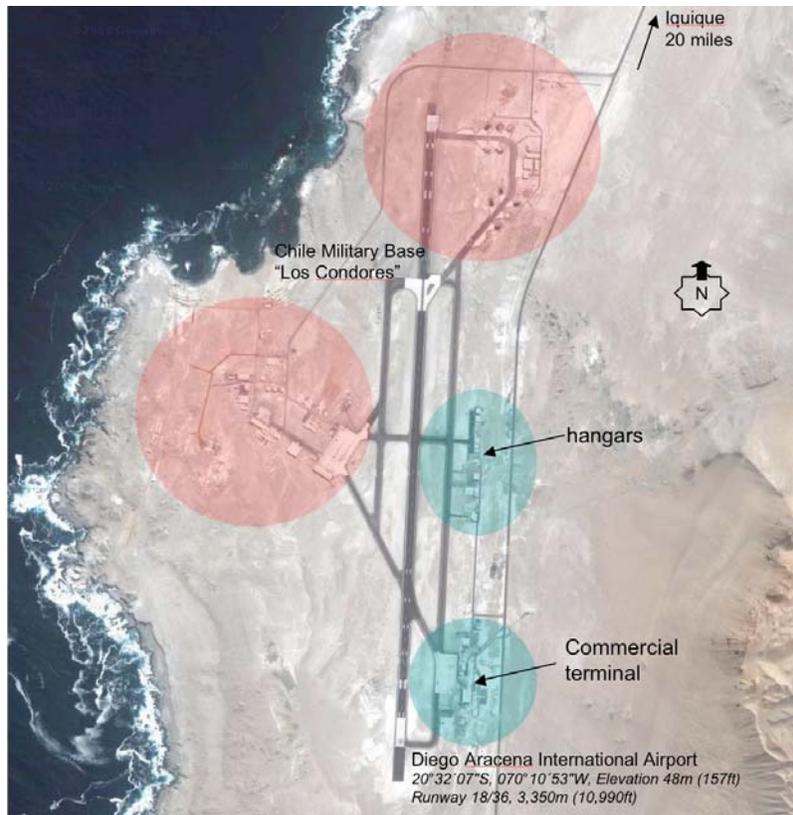
ad.iquique@dgac.cl



FBO: Just like at Arica airport, there are no Fixed Based Operators (FBO) located at the airport, so either LAN Chile or Sky Airlines will have to be approached for any services required. LAN Chile is the larger of the two operators and offers ground support to 3rd parties, therefore preferable. Aircraft operators will need to submit request for services to LAN (Santiago) headquarters for a price quote. The Chilean military FBO could also be approached through diplomatic channels if necessary.

Gases: LAN Chile stated that they have similar services to those in Arica, nitrogen and oxygen are available at the airport; lavatory service equipment was also available. LAN Chile has ground power carts available but NCAR plans on shipping all their own ground support equipment to be self-sufficient. No dry ice is available in town and will have to be flown in from Antofagasta.

Parking: the four research aircraft at the Diego Aracena International airport will require that the two smaller aircraft be parked away from the apron area located next to the terminal and parked on one of the taxiways near the hangars. This may require that these aircraft start engines and taxi to the fueling pits located on the commercial apron. The C-130 and the BAe-146 should be able to park on the apron area next to the terminal. This area is usually used for cargo aircraft that do not work on a regular schedule.



Fueling: Fuel services are available from AirBP, Exxon (COPEC) and Shell Oil. Shell currently has a small fuel truck, but we were told that the Shell concessionaire license would not likely be extended for next year. The fuel suppliers can work arrangements for fuel through World Fuel but they do not accept personal credit cards or checks. Parking locations for the two smaller aircraft will require that they taxi or be towed to the fuel pits, the C-130 and BAE-146 should be able to fuel from their parking locations.

Operations: Similar to Arica, all operations on the airport apron and taxiways are controlled by the airport tower, a well established path of communication will have to be set up (telephone or radio). The project aircraft will be required to file IFR (instrument flight rules) flight plans about 30 minutes before each flight. ATC does not expect the project to create any problems, since most of their flights over water are at or below flight level 30,000 (ft). Only small aircraft, fish spotters, operate next to the coast lines near Iquique, and they are also on IFR flight plans and are required to have transponders. The NSF C-130 will be able to spot them with their TCAS system. During operations, each aircraft is expected to report back to Iquique every 30 minutes, however other arrangements can be made (e.g., communications with the Ops Center).

Space: There are some buildings available that could serve as temporary lab operations and storage space just north of the main terminal in the hangar area. We were warned that the airport would undergo a major renovation next year (2008). The airport will continue to operate normally during the construction but the area where the office space is located

will be the most affected. The Airport manager stated that this would not affect our operations, but it is suggested that a schedule of the renovations should be obtained from the planning office in order to prevent any conflicts with the VOCALS operations.



Security: The airport security operates 24/7 and covers all areas of the airport.

Transportation: The international airport is 41 km (25 mi) south of downtown via Ruta 1. The one-way trip from the airport to the south side of town (Radisson), takes approximately 35 minutes along the coastal highway. Flight crews will need their own transportation to and from the airport. Arrangements with rental agencies will have to be made early to make sure that enough rental cars are available for project personnel. Iquique is well served by rental car companies; Hertz, Budget and Econorent rentals are available at the airport.



Hertz was able to provide the survey team with an 8-passenger van on short notice. Most rental companies add the value of full collision and comprehensive insurance coverage to the rental agreement, no personal liability or personal protection coverage is available. It is strongly recommended to check for the coverage when receiving the car. American driver licenses are accepted when renting a car, but we strongly suggest that prior to leaving the US, everyone should obtain an international driving permit. Taxis are available when commercial aircraft are coming in or going out. A cab ride to town is

about \$2,000 pesos one-way per person in a shared taxi.

ACCOMMODATIONS:

(1) Radisson Hotel- Iquique

Arturo Prat 3939
Iquique, Chile

Guadalupe Vallejos
Sales Executive
Phone: +56 57 381 188
Fax: +56 57 380 434
Email: gvallejos@radisson.cl
<http://www.radisson.com/iquiquecl>



Radisson Iquique is ideally located overlooking the ocean, just minutes away from the city's business district and the social hot spots of Playa Brava and Cavancha. The Hotel Radisson offer wireless (satellite-based) Internet access in most of its property at a decent speed (the bandwidth can be increased), as well as complimentary shuttle service to and from the airport. The hotel has 78 room and most of them offer very nice views of the ocean as well as work desks, cable television (with some channels in English) telephone, coffee maker, minibar, safe deposit boxes and ironing boards.

The hotel offers two meeting rooms with capacity of up to 40 people (maximum each). The conference rooms are small (cannot be joined) but very well equipped with support services that include microphones, amplification systems and work desks. For those looking to stay in shape, Radisson offers a small exercise room as well as an outdoor pool and Jacuzzi.

The hotel offers mobile rental phones for all guests at the front desk as well as an exclusive 30% discount rental on Avis car rentals (arrangements at the front desk).

The food at the hotel is good and is served at the Brick Restaurant (by the Lobby area). The breakfast buffet was open from 6:30 to 10AM and was included in the cost. The hotel is within a short drive to the Mall of the Americas, at this mall, a food court is available with local Chilean food and the traditional mall food (KFC, Pizza Hut, etc)

Cost per night for a single room was \$88 for foreign nationals.

(2) Holiday Inn Express - Iquique

Av. Arturo Prat 1690
Iquique, Chile
Laura Fuentes G. General Manager
Phone: +56 57 433 300
E-mail: reserves@talbot.cl
<http://www.holidayinn.cl/app03/hogar/iqq.html>



The Holiday Inn Express Iquique offers 82 guest rooms in 6 floors near Playa Brava. This hotel is near the mall area and walking distance to all American fast food restaurants (KFC, McDonalds, Pizza Hut, etc).

The hotel offers several amenities, Wifi is available throughout the hotel, the health and fitness center is rather small but well equipped, outdoor pool, ice machines in every floor, etc.

The rooms are standard (some with a sitting area) and are available for smoking and non-smoking patrons.

Breakfast is served from 6:30- 9:30 AM and it is usually included on the rate when booking the room (sometimes is not). A small convenience store is located inside of the hotel, offering snacks and drinks.

The hotel has 3 meeting rooms with capacity for a maximum of 30 people each. The rooms are well equipped with microphones and video equipment.

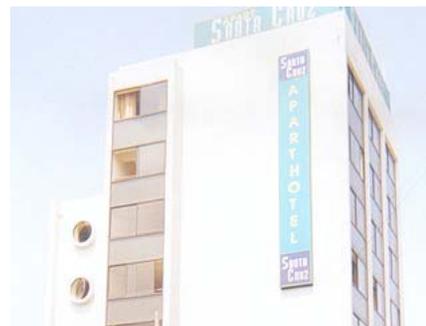
Price per night: \$88 – 130 per night (smoking and non-smoking rooms available).

OTHER HOTELS and ACCOMODATIONS



Iquique is a resort destination, and there is a high demand of long term accommodations, There are several “Apart Hotels” available throughout the city and at the moment of the site visit, it was not possible to see one but these are usually fully furnished apartments in a high rise building. These types of accommodations are readily available in Iquique and can be booked on demand. The rates vary from \$60 USD for a single, studio type apartment to \$80 USD for a 3-bedroom unit.

Apart Hotel Condell
587 Thompson St.
Telephone: (5657) 391 460
Fax: (5657) 391 461
Iquique
Chile



Sergio Cortz, a potential local contact, owns a 3 bedroom condo (132 m2) right at the beach. The rent is 95US\$ per day and includes a garage. This may be a

good condo for either the GAUS group or students. Reservations would have to be made a couple of months ahead of time.

Sergio Cortez G.
Bolivar 684
Phone 57-428483
civetcor@vtr.net

UNIVERSIDAD ARTURO PRAT

We met with Rosalino Fuenzalida of the *Universidad Arturo Prat*. He is very interested in participating in the project and wants to give all the necessary help that is needed. We are considering the university campus as the site for the daily launch of the research radiosondes. Rosalino is offering office space as well as laboratory space for the use of the team launching the radiosondes. The University Arturo Prat Campus is within walking distance from the Radisson Hotel previously described.

The university is fully equipped with top of the line laboratory space, 24-hour access to the building, fast internet access available throughout the building.

The campus is located near the shoreline with several points where the launches can be done. Overall, Rosalino is willing to help this happen, he also suggested the involvement of students in the launches and possible data analysis.

We did not discuss the possibility of an Operations Center at the university campus.



Rosalino Fuenzalida Fuenzalida

Dr. Oceanografía
rosalino.fuenzalida@unap.cl
rfuenza@udec.cl
rocky.fuenzalida@gmail.com
Depto. Ciencias del Mar
Universidad Arturo Prat
Tel. Oficina (Office): (56)(57) 394562
Tel., Casa (Home): (56)(57) 313364
Celular (cell phone): (09) 82958698

Helium - There are two companies that provide helium:

1) **AGA S.A.** (Paula Jaraquemada 1125, Phone: 600 – 6000242, Fax: 26 2785 located in Antofagasta) , and

2) **INDURA Gases Industriales** (Phone 600 600 3030, Fax: 600 600 6789, ventas@indura.net - www.indura.net).

We spoke with both distributors and they mention a worldwide shortage of helium. But were assured that by planning ahead of time, they should be able to provide Helium (which will be brought in from Antofagasta).

Dry Ice - No Dry Ice available in Iquique, if needed, it will have to be brought in from Antofagasta

All third party introductions were made by Juan Aravena Pelizari and Jorge Carrasco from the Chilean National Weather Service. Their support is greatly appreciated.

Juan Aravena Pelizari

Chief , Northern Region
Camino Mejillones s/n
Antofagasta
Phone (56) 55 269077
90200261 (mobile)
jaravena@dgac.cl

Jorge Carrasco

Climatologist
MeteoChile, Santiago
(+56) 2 436 4519
jcarras@meteo Chile.cl
<http://www.meteo Chile.cl/>

Santiago de Chile

During the visit, we met with the Office of Naval Research staff at the U.S. Embassy and with staff from the Civil Aviation Office in Santiago, and scientists from the University of Chile.

CONTACTS

US Embassy, Santiago de Chile

Sonia Wolff

Assistant Director
Office of Naval Research
US Embassy Santiago
Unit 4120
APO, AA 34033-4120
Tel: 011 56 2 330 3154
Fax: 011 56 2 330 3702
sonia_wolff@onr.navy.mil
www.onr.navy.mil

Elmer L. Roman (Main Contact)

Regional Director - Americas
Office of Naval Research Global
US Embassy Santiago
Unit 4120 Box 102
APO AA 34033-4120
Tel: 011 56 2 330 3487
Fax: 011 56 2 330 3702
Elmer_roman@onr.navy.mil
www.onr.navy.mil

Robin L. Dunnigan

Primary Secretary Economics
Ave Andrés Bello 2800
Santiago, Chile
Tel: 011 56 2 330 3334
Fax: 011 56 2 330 3118
dunniganrl@state.gov
www.usembassy.cl

Robert J. Scott

Colonel, US Air Force
Andrés Bello 2800
Santiago, Chile
Tel: 011 56 2 330 3391
Fax: 011 56 2 330 3191

Bill Melton

ONR Santiago
william_melton@onr.navy.mil

We briefed the staff from the Office of Naval Research at the U.S. Embassy on VOCALS-REX and our airport visits the week before. They were very interested in the project and wanted additional information regarding ONR-sponsored investigators and research goals. Elmer Roman, the ONR liaison suggested that someone from the VOCALS Project accompany him during a scheduled visit (Nov 07) to Peru to discuss common research interests (and perhaps an opportunity to brief Peruvian civil aviation authorities). More involvement of South American scientists was also suggested to provide opportunities for Chilean and Peruvian scientists to obtain funding from the NSF equivalent CONISIT. ONR also has a standing invitation to visit the president of CONSIST, which should be informed about the project.

We were joined by the embassy naval attaché and air attaché who offered advise in coordinating aircraft and ship operations with the Chilean military. We mentioned our previous meeting (in April) with the Director of Chilean Civil Aviation (DGAC), Gen José Huepe Pérez and the director of the Chilean Weather Service, Ms Myrna Areneda Fuentes and their offer of full support. We were cautioned, once again, on the additional paperwork required for clearances for aircraft with military registrations. Because the project involves research vessels and is conducted over the ocean, the Chilean Navy needs to be kept in the loop.

Robin Dunnigan, 1st Secretary, Economic Policy Section, was also present during the meeting; Environment, Science and Technology activities fall under her jurisdiction in Chile. She is currently working the clearances for the NOAA *R/V RH Brown* STRATUS-07 cruise through the Chilean Foreign Ministry. She would like to introduce the *Secretaría de Relaciones Exteriores* to VOCALS-REX as soon as possible. The Project Office will submit information regarding the scope of the research, platforms and facilities, foreign participants, Chilean collaborators, draft list of items to be temporarily imported into Chile, etc. Additional suggestion was made to brief the appropriate official at the Chile Embassy in Washington D.C. regarding VOCALS activities. A dip note for VOCALS, describing dates, lead times, objectives etc., needs to be prepared that has to go through the Chile desk at the US State Department. About six months are needed to complete the project.

Civil Aviation, (Dirección General de Aeronáutica Civil) Santiago

Alberto Fernández Donoso

Jefe de los Servicios de Tránsito Aéreo
San Pablo 8381
Pudahuel, Santiago Chile
Tel: 011 56 2 290 4610
Fax: 011 56 2 644 1446
afernandez@dgac.cl

Raúl Manriquez Casanova

Controlador de Tránsito Aéreo
Departamento ATS
San Pablo 8381, Santiago, Chile
Tel: 011 56 2 290 4605
Fax: 011 56 2 644 1446
rmanriquez@dgac.cl

Héctor Carrera Ponce de León

Manager, Iquique Airport
Aeropuerto Diego Aracena
Iquique, Chile
Tel: 011 56 57 410 787
Fax: 011 56 57 420 037
ad.iquique@dgac.cl

Julio Schnettler

Manager (DGAC), Arica Airport
Chacalluta Airport
Arica, Chile
(+56) (58) 211 128
(+56) 09 158 1710 mobile
ad.arica@dgac.cl

Guillermo Rivera

LAN Services Manager, Arica Airport
(+56) (58) 212 566
(+56) 09 330 5063
guillermo.rivera@lan.com
<http://www.lan.com/>

Meeting with Air Transit Services

We met with Alberto Fernández, Chief, Air Transit Services, Raúl Manriquez, Senior Controller, ATC and a representative from the Chilean Weather Service (Jorge Carrasco) to discuss proposed flight plans and operations during the field campaign. In particular, commercial airways in the research area, military restricted zones and required coordination with ATC was discussed.

They were very supportive of all our operations and as previously stated, coordination and procedures with the local airport air traffic authority would be sufficient. Courtesy notification to DGAC/ATS headquarters in Santiago would facilitate their monitoring of REX flight plans, and assist with any potential search & rescue operations. We also addressed coordination of research radiosonde launches from Iquique. All that is required is contact with the local airport tower for clearance to launch. We touched on the international border dispute along the Peruvian border (near Arica). Peru's unilateral legislation to change its latitudinal maritime boundary with Chile to an equidistance line with a southwestern axis favoring Peru has created a border dispute. They stated that they follow the currently accepted air space boundaries sanctioned by ICAO; and any local coordination (approach and departure) with the nearby Peruvian airport (Tacna) is done by the Arica ATC personnel.

We touched on military observers flying onboard VOCALS aircraft; these are usually only required for overland flights, not for oceanographic flights. Arrival and departure of the aircraft into Chile will be considered international flights. All other flights are considered domestic. Request to waive fees need to go through the embassy request. Airport terminals are operated by concessionaries and therefore interested in the revenue. To prevent boarding tax, all scientists should be declared as crew as well.

Radar Coverage:

Iquique and Antofagasta have radars, but Arica does not, they are coordinated with the Chilean Navy. The radars typically reaches 450 to 480 nautical miles west of Iquique and about 180 nautical miles west of Antofagasta as long as operations are around 30,000 ft altitude. Radar coverage is closer to the coast for low-flying aircraft. In case of a water landing, the rescue will be managed by the Chilean Air Force in coordination with the Navy.

Communications:

VHF, HF radio contact; call sign: ***Santiago Oceanic***

Iridium communications are also possible, coverage problems are known for Easter Island and Antarctica.

Radiosonde Operations

Sonde launches need to be cleared by the tower, NOTAMs will be created.

Please note that the DGAC website (www.dgac.cl) seems to work in Chile but access from the US points to an Oracle website. An alternate access point is http://www.aipchile.cl/dasa/aip_chile_con_contenido/index.php

University of Chile, Santiago

José A Rutllant

Profesor Titular
Blanco Encalada 2002
Santiago, Chile
56 2 978 4563
56 2 696 8686
jrutllan@dgf.uchile.cl

René Garreaud

Profesor Asociado
Blanco Encalada 2002
Santiago, Chile
56 2 978 4310
56 2 688 9696
rgarreau@dgf.uchile.cl
<http://www.dgf.uchile.cl/~rgarreau/>

Laura Gallardo

Adjunct Professor
56 2 978 4882
56 2 688 9705
lgallard@dim.uchile.cl
<http://www.dim.uchile.cl/~lgallard>

Additional Information and Photographs are available from the VOCALS Web Site
<http://www.eol.ucar.edu/projects/vocals/>