Geo-Network of Latinamerican-German Alumni

ALEMANIA MÉXICO ALIANZA PARA EL FUTURO

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GOAL WORKSHOP 2017

"THE ROLE OF GEOSCIENCES TO SOCIETAL DEVELOPMENT: A GERMAN - LATIN AMERICAN PERSPECTIVE"

MONTERREY & LINARES, MEXICO

8 – 15.05.2017

FACULTAD DE INGENIERÍA CIVIL

UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN

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Mexico is a growing land with a long history and a rich heritage, both geological as well as cultural. Its economic and social development is strongly linked to the natural resources, i.e. metallic and nonmetallic minerals and oil and gas. The extraction and transformation of those materials had led to profound environmental impacts in several regions. These effects, together with natural risks, triggered by earthquakes, hurricanes and volcanism, forced the Mexican society to try to better understand the Geology that rules its development. During the 2017 Goal workshop, participants will have the chance to present, analyze and discuss topics and real cases where the geological conditions rule the progress of a nation.

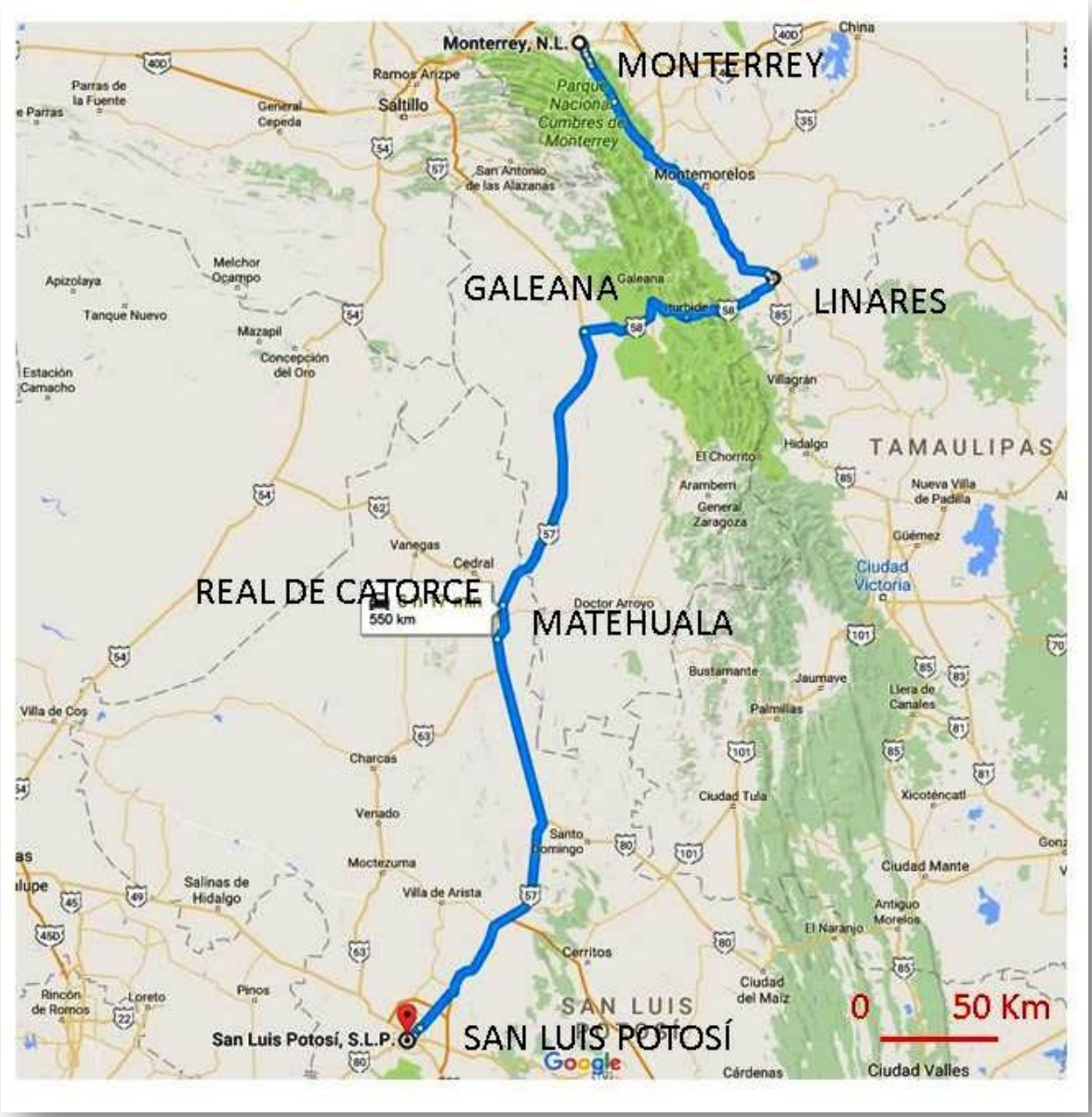
Goal members, researchers, representatives of the industry and government offices, and students will be invited to participate, in a multicultural and interdisciplinary atmosphere.

P R O G R A M

	May 2017					
Sun	**Mon**	**Th**	**We**	**Tu**	**Fr**	**Sat**
7	**8**	**9**	**10**	**11**	**12**	**13**
Arrival in Monterrey International Airport Mariano Escobedo	**1) FIC UANL Monterrey*** **Expert´s Seminar** **Public presentations**	**1) FIC UANL Monterrey** **Expert´s Seminar** **Public presentations**	**2) Fieldwork Monterrey:** **Huasteca Canyon, Flood control Dam, Cement plant**	**3) Goal Meeting in FCT UANL Linares.** **Cultural evening**	**4) Fieldwork Transect Linares-Matehuala: Santa Rosa Canyon, Galeana karstic structures, Potosí underground fires**	**5) Fieldwork Transect Matehuala - San Luis Potosí: Matehuala mines, Real de Catorce old mining town**
Sleep in Monterrey				***Sleep in Linares***	***Sleep in Matehhuala***	***Sleep in San Luis Potosí***
14	**15**					
6) Fieldwork San Luis Potosí: Risks and urban pathology.	**Return to Monterrey from San Luis Potosí.****					
Sleep in San Luis Potosí						

**** NOTE: ACTIVITY 1 IS OPEN FOR THE PUBLIC. ACTIVITIES 2 TO 6 ARE RESTRICTED FOR REGISTERED GOAL MEMBERS.***

***** FOR THOSE WHO TAKE A FLIGHT DIRECTLY AFTER THE WORKSHOP, THE PLANNED ARRIVAL IN MONTERREY THE 15.5 IS CA. 18:00, HIGHLY DEPENDING ON TRAFFIC CONDITIONS.***



Proposed route of GOAL Workshop Mexico 2017

1. EXPERT'S SEMINAR, 8. and 9.05.2017

Monterrey, N.L., Civil Engineering School (Facultad de Ingeniería Civil) Universidad Autónoma de Nuevo León.

9:00 – 13:00 and 15:00 -18:00

Sleep in Monterrey

Proposed Topics, Public presentations.

a) Geological overview of Mexico.
b) Impact of geological and hydrometeorological risks to the urban development.
c) Seismicity in a non-seismic region.
d) Characterization of hydrocarbon contaminated areas.
e) Water contamination by industrial and mining activities.
f) Karstic landscapes and related risks.
g) Natural underground fires.
h) Urban pathology.
i) Sustainable GeoResources development.

2. FIELD WORK AROUND MONTERREY, 10.05.2017

2.1 HUASTECA CANYON, SIERRA MADRE ORIENTAL

14 R 354465 m E, 2838120 m N

Huasteca Canyon is located directly in the southern vicinity of the metropolitan area of Monterrey. It presents the geological development of the Sierra Madre Oriental (SMO) fold and thrust belt, one of Mexico´s most relevant geological provinces. It is important not only by its dimensions, but for the geo-resources and control over social development during Mexican history.

The canyon cuts the Mesozoic sedimentary sequence, consisting mainly of Upper Jurassic to Upper Cretaceous carbonates and shales. Topics to discuss in the field are:

a) Geology and paleogeography of the SMO,

b) Geology of the Monterrey salient ("Curvatura de Monterrey"),

c) Water resources contained in this complex, and

d) Importance to society of the “Cumbres de Monterrey” National Park.

Landscape in the interior of Huasteca Canyon, showing the core of one of its anticlines

2.2 “ROMPEPICOS” DRY DAM

14 R 359577 m E, 2827302 m N

The Rompepicos dam was constructed in 2002 with the intention to regulate the extraordinary floods in the Santa Catarina river that directly crosses the Monterrey metropolitan area. The dam already and successfully controlled the runoff from heavy rains of two major tropical hurricanes, Emily (2005) and Alex (2010). The damages were minimal, compared to those provoked by Gilbert (1989), when at least 200 persons died in the floods.

Already in 1896, Colonel José Andrew Robertson asked for permission to the Nuevo León State Government to build a dam to control the seasonal floods and to start water supply for Monterrey. The idea was dismissed for over 100 years, but the regional development forced to the construction of this regulation structure.

Interior of the Rompepicos dam during the dry season

2.3 VISIT TO CEMENT INDUSTRY FACILITIES

The history of economic development of Monterrey is strongly linked to the cement industry, due to convenient local supply of calcareous and argillaceous materials from both the Sierra Madre Oriental and the Parras Basin.

The group can visit two localities:

1) Abandoned limestone quarry in Cerro de las Mitras, property of Cemex, the biggest Mexican cement company (***14 R 360767 m E, 2840690 m N***). The open pit structures still represent a potential risk for the inhabitants of the metropolitan area of Monterrey.
2) Short trip to the Ramos Arizpe plant of Holcim-Lafarge, the world leader in this industry (***14 R 312420 m E, 2834095 m N***).

The discussions during the field work will be focused on the industrial processing, and its environmental impact.

Holcim-Lafarge plant in Ramos Arizpe

3. INTERNAL GOAL MEETING, 11.05.2017

Earth Sciences School (Facultad de Ciencias de la Tierra) UANL facilites. Drive Monterrey - Linares N.L., 130 km.

8:00 – 18:00 Linares

GOAL: Reports, status, future activities and perspectives.

The Earth Sciences School (Facultad de Ciencias de la Tierra, FCT), is a successful case of German – Mexican academic collaboration. This Geosciences center is located in a nice old Mexican Hacienda from 1667, which will be an excellent place for the internal Goal meeting. FCT offers a wide spectrum of academic programs, from technicians in Geosciences, Geology, Mineralogy, Geophysics and Oil Engineering, to Master and PhD in Geosciences.

Aquarelle of the Hacienda de Guadalupe, by Honorato Alatorre.

Cultural evening in Linares offered by the Local Authorities

4. TRANSECT LINARES – MATEHUALA, 12.05.2017, 230 km

For the second day of the field activities, after the GOAL meeting in Linares, a geological transect is planned. It starts in Linares and ends in Matehuala, in the state of San Luis Potosí, reaching a length of ca. 230 km. It comprises three main localities and topics; nevertheless during the trip other themes will be discussed.

4.1 SANTA ROSA CANYON

14 R 426825 m E, 2737900 m N

The Santa Rosa Canyon represents a "textbook example" of a geological profile, perpendicular to the main structural train of the SMO. The road offers outcrops of strong folded and faulted strata, due to the Cenozoic Laramide orogenesis. The selected localities will allow discussing the deformation history of these mountains, and the problems related to slope instability and hydrometeorological risks.

Road cut in the Santa Rosa Canyon

4.2 KARSTIC GEOLOGY IN GALEANA

14 R 385576 m E, 2745093 m N

Galeana is located in the central part of the SMO, and represents an uplifted area due to tectonic stresses by the Laramide orogenesis. Its stratigraphy is dominated by Jurassic siliciclastic and evaporitic rocks at the base of the Mesozoic stratigraphic column.

Here, gypsum and anhydrite build thick and strongly deformed bodies with minor limestone strata. Impressive karstic structures, such as dolines or sinkholes (cenotes), have developed due to long lasting dissolution processes.

Nice examples are the “Pozo de Gavilán” near Galeana, a ca. 60 m wide and 60 m deep cenote, and the subsistence effects at “Laguna de Labradores”. Goal of the visit is to show and explain the karstic phenomenon and the related risks to the inhabitants of Galeana, namely cryptic collapses and regional subsidence.

Pozo del Gavilán

Laguna de Labradores

4.3 POTOSI PEAT DEPOSITS AND UNDERGROUND FIRES

14 R 365945 m E, 2748575 m N

Climatic conditions were quite different during the early Quaternary as compared to the present. In postglacial times the weather was warm as today, but with higher precipitation rates. Intramontane lakes and related playas were the site of local forests and wetlands. Peat deposits developed under diagenetic conditions and due to local subsidence and periodic sedimentation. Today the area presents strong problems of subsidence and underground fires, affecting local agricultural plantations (potatoes) and the integrity of the Central Highway 57, one of the roads with denser traffic in Mexico.

Peat deposit and underground fire, Catarino Rodríguez

5. TRANSECT MATEHUALA TO SAN LUIS POTOSÍ, 13.05.2017, ca. 310 km

5.1 MATEHUALA

14 Q 331929 m E, 2615487 m N

The small town of Matehuala is located in the semiarid Mexican Altiplano. Active Pb-Ag-Zb-Cu mining activity has a profound environmental impact on soils and underground water. The ore deposits relate to a Cenozoic granodioritic magmatic complex, intruded in Cretaceous limestones. Several modern works have been developed to detect influences on public health.

Santa María de la Paz mine interior, showing the typical copper mineralization

5.2 REAL DE CATORCE

14 Q 307456 m E, 2621184 m N

Visit to Real de Catorce, one of the best examples of a "Magic Town (Pueblo Mágico)" of Mexico. It is an abandoned silver mining town in the top of Sierra de Catorce at ca. 2,800 m a.s.l. The early 20th Century Mexican Revolution forced the exodus of the miners, their families and all kind of adventurers. It is still a religious center for the Huicholes Indians, who pilgrimage

hundreds of kilometers every year from other Mexican states (Nayarit, Jalisco and Durango) to the Cerro Quemado (Burned Hill) to perform transcendental ceremonies.

The stay in Real de Catorce includes the visit of selected geological exposures, historical buildings like the oldest mint house Mexico´s and abandoned mining facilities.

View of Real de Catorce, historical mining town

6. SAN LUIS POTOSÍ, 14.05.2017

SAN LUIS POTOSÍ

14 Q 296109 m E, 2450614 m N

San Luis Potosí's historical center displays a great blend of different artistic styles in many buildings and is a major example of colonial architecture in Mexico. In 2010, the historic center in the geographic center of Mexico was listed as UNESCO World Heritage Site. Many of the buildings show baroque architecture, representing an interesting mixture of Mexican and Spanish cultures. However, those buildings are suffering the effects of the pollution by industrial activity. The tuffaceous blocks display slow but continuous physical and chemical degradation. The analysis of this phenomenon is part of urban pathology projects. On the other hand, the city of San Luis is situated along active tectonic faults affecting dense constructed areas.

In San Luis Potosí the opportunity to visit colonial buildings with strong aging effects due exogenic alteration processes accelerated by anthropogenic activities. During the last fieldwork day, the effects of the modern active extensional tectonic of the Basin and Range province on the city development will be discusses in situ.

Nice example of a historical building in San Luis Potosí

RETURN FROM SAN LUIS POTOSÍ, S.L.P. TO MONTERREY, N.L. 15.05.2017, ca. 520 km

Arrival in Monterrey ca. 18:00. As an alternative, Mexico City is 340 km south of San Luis Potosí, for those who want to continue their trip by their own.

Juan Alonso Ramírez Fernández, René Alberto Dávila Porcel, Héctor de León Gómez, Adalberto Treviño Cázarez

Organizing Team in Mexico

Stand 12 January 2017