

香港中文大學理學院

FACULTY OF SCIENCE

THE CHINESE UNIVERSITY OF HONG KONG



Earth System Science Programme

Programme Introduction

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Why study Earth System Science?



如果你...

- ❖ 想瞭解**地球系統如何運作**
- ❖ 想擁有**良好數理基礎**, 又可**應用科學知識**參與解決21世紀的一些**重大環境問題** (如全球環境變化、氣候轉變、空氣及水污染、自然與地質災害、能源開發等)



If you want to...

- ❖ Understand how the **Earth system operates**
- ❖ Acquire **good quantitative skills and apply scientific principles to solve some of the most pressing environmental problems** (e.g. global and environmental climate changes, air and water pollution, natural and geological hazards, energy/ resources exploration...)

ESSC Curriculum | 課程大綱



學習和研究地球系統中各圈層的運作過程，
以及它們之間的相互作用對地球環境所產生的影響。

Study mechanisms of all “spheres” of the Earth system,
and their interactions shape the Earth’s environment.



ESSC Curriculum | 課程大綱



這些系統部份包括大氣圈、水圈、冰雪圈、岩石圈和生物圈等。透過學習這些部份的運作情況，可以瞭解及參與減輕自然和人為的環境威脅。

The system consists of the atmosphere, hydrosphere, cryosphere, geosphere and biosphere. Via studying their processes, we understand and help mitigate natural and manmade environmental threats.

Curriculum Design | 課程理念



Building upon traditional science disciplines, including, e.g., **geology (地質學)**, **meteorology (氣象學)**, and **oceanography (海洋學)**, we aim to establish an exciting **interdisciplinary** programme in Earth System Science (地球系統科學是一個**橫跨傳統學科**的嶄新課程).

We aim to equip students with a solid foundation in **basic sciences (physics, chemistry, biology)**, **quantitative skills (statistics, computation)**, and **practical knowledge of the Earth System**, so that they are prepared to participate in tackling the various environmental challenges facing us today.

Teaching Staff



Man Nin CHAN (陳文年), Associate Professor & Director
Ph.D., Caltech; Postdoctoral Fellow, Lawrence Berkeley Nat. Lab.
Areas: Aerosol chemistry, composition, Formation and transformation of secondary organic aerosols, Aerosol instrument techniques



Amos Pui Kuen TAI (戴沛權), Associate Professor
Ph.D., Harvard; Croucher Postdoctoral Fellow, MIT
Areas: Atmospheric chemistry & physics, Climate-chemistry-biosphere interactions, Impacts of global environmental change



Francis Chi Yung TAM (譚志勇), Associate Professor
Ph. D., Atmospheric and Oceanic Sciences, Princeton University
Areas: Climate dynamics, global warming and extreme events, Dynamical downscaling



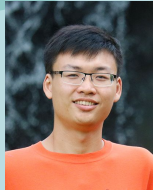
Joe Shing Yip LEE (李成業), Professor (by Courtesy)
Ph.D., Wetland Ecology, HKU; Professor, Griffith University, Australia
Areas: Ecology and biogeochemistry of estuarine wetlands, Application of stable isotopes in marine environmental research, Marine ecosystem dynamics, Rehabilitation and restoration

Teaching Staff



Lin LIU (劉琳), Associate Professor & Division Head

Ph.D., U. of Colorado, Boulder; George Thomson Postdoctoral Fellow, Stanford
Areas: Remote sensing applied to earth system science, Cryospheric Sciences, Space Geodesy, Deep Learning



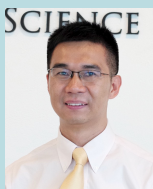
Yen Joe TAN (陳衍佐), Assistant Professor

Ph.D., Geophysics, Columbia University
Areas: Volcanic eruption dynamics, Seismic imaging and monitoring with ambient noise, Machine learning and data science, Induced and triggered earthquakes



Teng-fong WONG (黃庭芳), Research Professor & Founding Director

Ph.D., MIT; Former Chair, Dept. of Geosciences, Stony Brook University; AGU Fellow
Areas: Earthquake mechanics, Rock physics applied to natural resources, Environmental hydrogeology.



Hongfeng YANG (楊宏峰), Associate Professor

Ph.D., Seismology, Saint Louis University
Areas: Subduction zone dynamics and megathrust earthquakes, High-resolution imaging of crustal fault zones and subsurface structure, Earthquake detection and location, Earthquake source mechanics

Teaching Staff



Tammy Pui Yuk TAM (譚佩玉), Lecturer

Ph.D., HKU; Postdoctoral Fellow, Assistant Lecturer, HKU

Areas: Metamorphic Petrology and Geochronology, Structural geology



Andie Yee Man AU-YEUNG (歐陽綺雯), Lecturer

Ph.D., City University of Hong Kong

Areas: Tropical meteorology, Seasonal climate prediction, Tropical cyclone activities



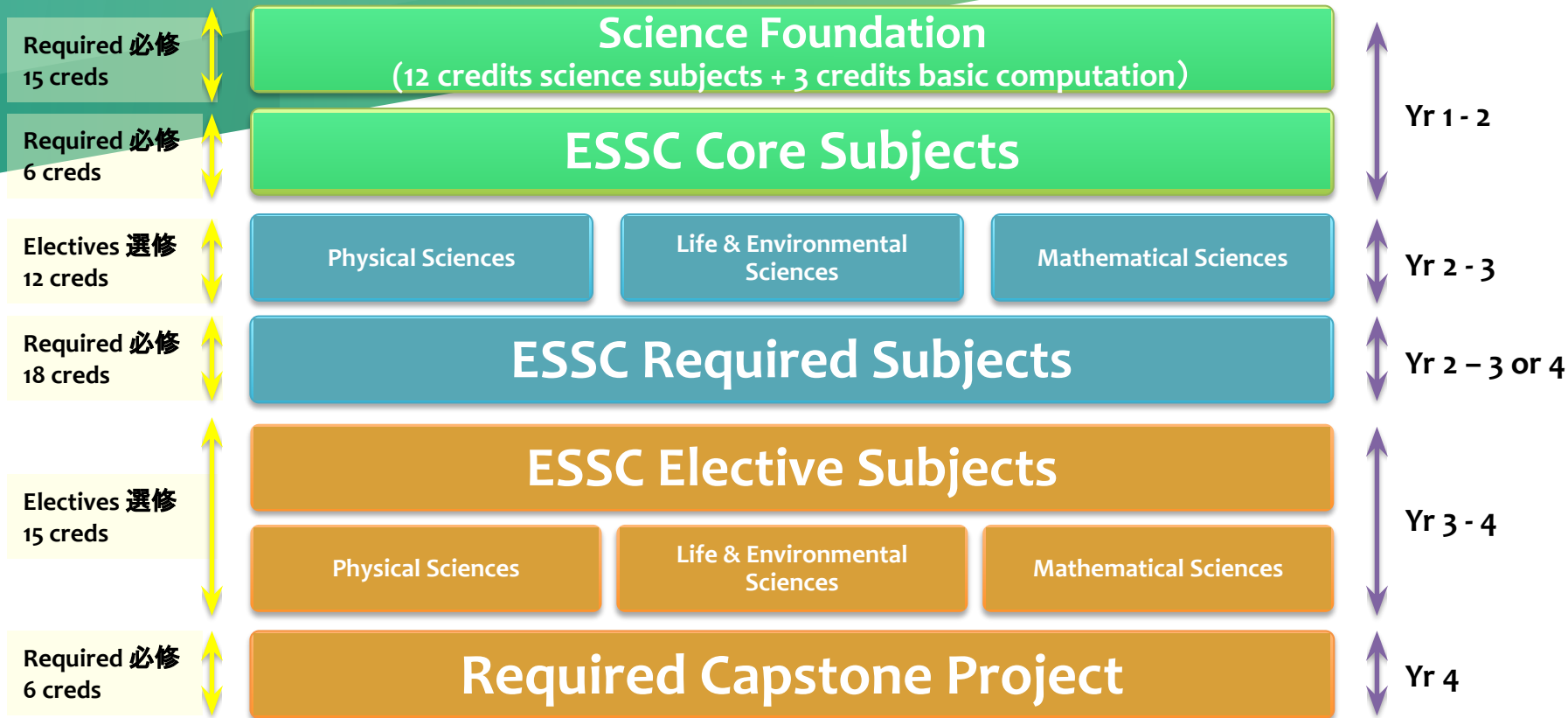
Ronald Kwan Kit LI (李鈞傑), Assistant Lecturer (Starting Sep 2021)

D.Phil., University of Oxford

Areas: Climate dynamics, Seasonal predictions

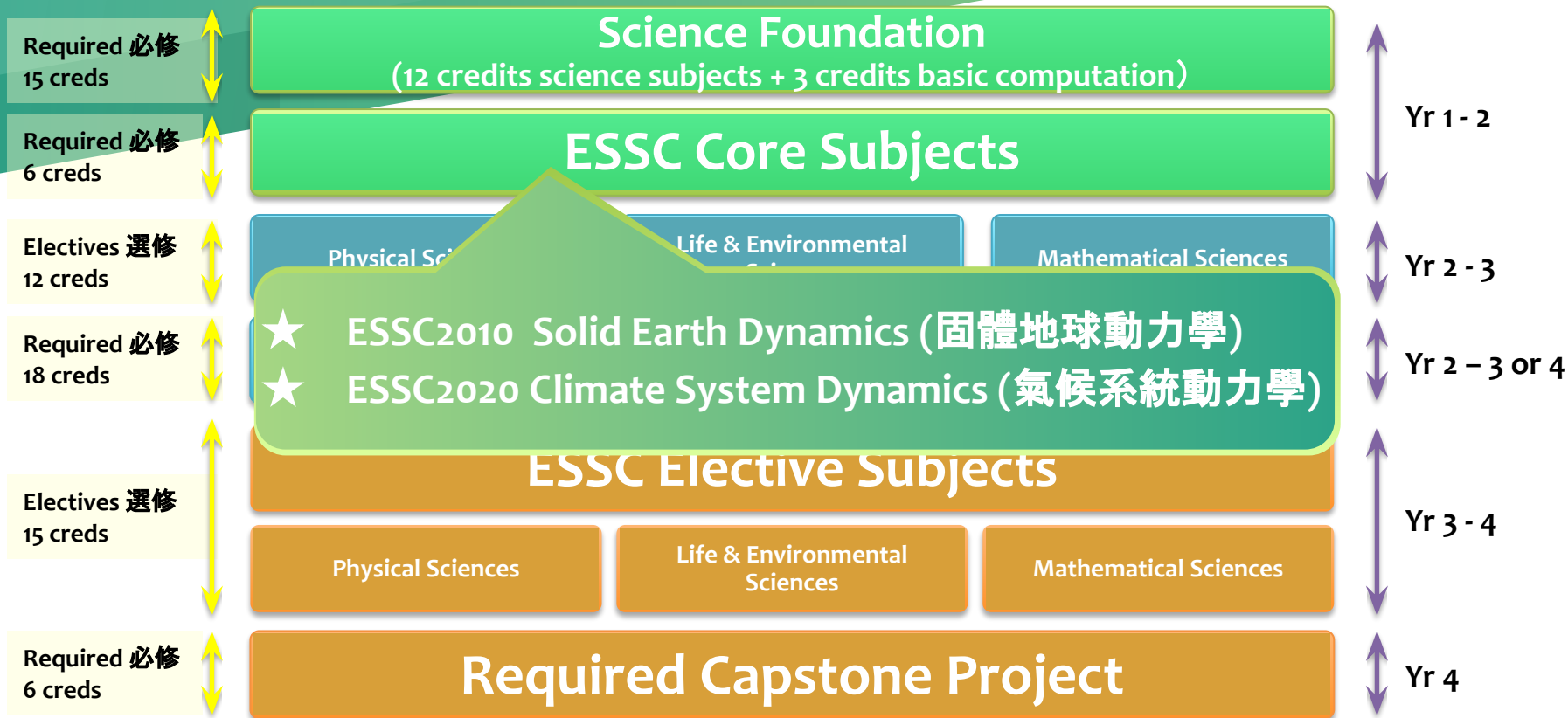
ESSC Major : 72 credits

University : 123 credits



ESSC Major : 72 credits

University : 123 credits



ESSC2010 Solid Earth Dynamics (固體地球動力學)

- Under the scientific framework of plate tectonics theory, this course explores the physics and chemistry of the Earth, and a diversity of geologic phenomena over a broad spectrum of temporal and spatial scales.
- Exciting topics include: earthquakes and volcanoes, mysteries of minerals and rocks, use of earthquake waves to probe interior of the earth.

ESSC2020 Climate System Dynamics (氣候系統動力學)

- An integrated introduction to the climate system, emphasizing the dynamics of the atmosphere and its physical and chemical interactions with other Earth system components.
- Applies basic scientific and mathematical principles to explain the history, current state and future of weather and climate, natural hazards, and climate change under natural variability and anthropogenic influences.

Admission Scholarships

HKDSE Best 5 Score	Scholarships offered by the ESSC Programme
≥ 33	\$25,000 (one-off)
≥ 31 or 29 (including one 5** in BIO/CHEM/PHY/M1 or M2)	\$10,000 (one-off)
≥ 29	\$5,000 (one-off)

The University and Colleges also offer admission scholarships for outstanding students.
大學及書院亦會為成績優異的學生提供入學獎學金。

Two Streams

- Atmospheric Science Stream
- Geophysics Stream
- (General Stream)

ESSC Core Subjects

Climate System Dynamics 氣候系統動力學

Solid Earth Dynamics 固體地球動力學

Supporting Science Subjects

Physical Sciences

Life & Environmental Sciences

Mathematical Sciences

ESSC Required/Elective Subjects

Atmospheric Science



Advanced Scientific Tools and Skills

Quantitative Methods for ESSC
地球系統科學計量方法

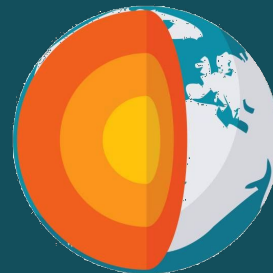
Numerical Method and Modelling 數值系統模型

Time Series & Statistical Analysis
時間序列與統計分析

Remote Sensing 遙感原理與應用

and more ...

Geophysics and Geology



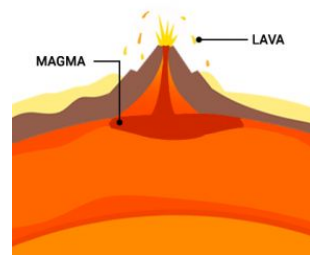
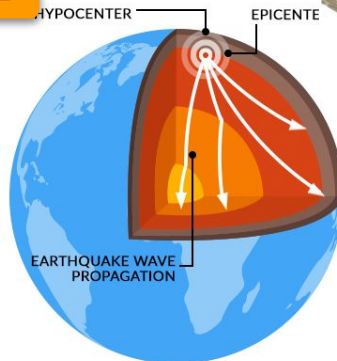
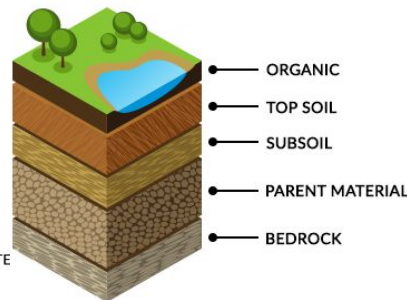
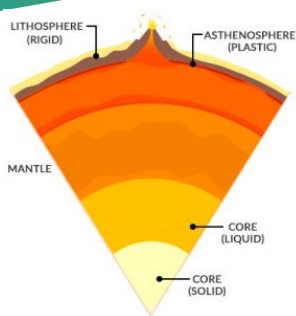
Geophysics Stream (地球物理組)

Geoscience Field Trip
地球科學野外考察 (神農架)
Integrated Geoscience Field Trip
地球科學野外綜合考察 (香港)
Fundamental Geoscience Fieldwork
地球科學野外綜合考察 (台灣)
Advance Geoscience Field Trip
野外地質考察 (五台山)
Marine Geology and Geophysics
海洋地質與地球物理學 (杭州)

❖ **Geophysics** focuses on studying the Earth using gravity - 重力, electromagnetic - 電磁力 & seismic methods - 地震波

❖ Students will acquire **solid physical** and **mathematical foundations** and **quantitative understanding** of the solid Earth, including:

- surface and internal structures - geotechnical engineering
- geohazards and mitigation
- exploration of mineral and natural resources



Structural Geology 構造地質學

Soil & Rock Mechanics 泥土岩石動力學

Engineering Geology 工程地質學

Physics of the Earth 地球物理學

Geomorphology 地貌學

Seismology 地震學

Petrology 岩石學

Hydrogeology 水文地質學

Continuum Mechanics 連續介質力學

Marine Geophysics & Geology
海洋地質與地球物理學

Applied Geophysics
應用地球物理學

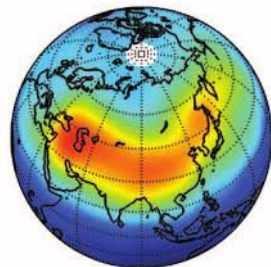
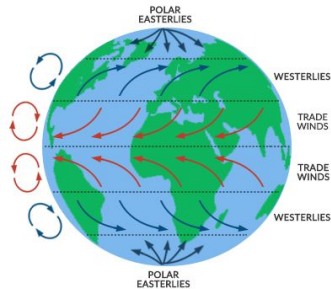
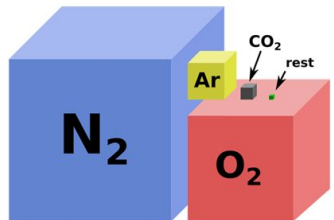
Volcanology
火山地質學

Atmospheric Science Stream

(大氣科學組)

❖ **Atmospheric science** is the study of the dynamics and chemistry of the atmosphere, hydrosphere and biosphere that surround the Earth.

❖ This encompasses the interactions between various parts of the atmosphere as well as interactions with the oceans and freshwater systems, the biosphere and human activities.



Physics and Chemistry of Aerosol
氣溶膠物理與化學概述

Ocean and Climate
海洋與氣候

Tropical Meteorology 熱帶氣象學

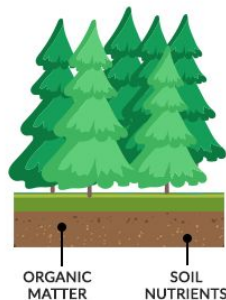
Atmospheric Chemistry
大氣化學

Air Pollution and Engineering
大氣污染科學與工程

Ecosystem and Climate
生態系統與氣候

Land-Atmosphere Interactions
and Boundary Layer Meteorology
地氣相互作用及邊界層氣象學

Atmospheric Dynamics
大氣動力學



PLANT GROWTH

PLANT/ANIMAL LITTER

DECOMPOSITION



Urban Climatology
都市氣候學

Two Streams

- You are recommended to declare your stream early on (e.g., in Term 2), but you are allowed to change your stream at any point before graduation.
- Please note that careful selection of elective courses in both streams, with 1-2 additional courses in Physics, can fulfill the requirements of a Minor in Physics.

Faculty Packages

- You should finish all these courses in Year 1:
 - MATH1010 (preferred), 1520
 - PHYS1111 (preferred), 1001, 1002, 1113
 - CHEM1070 (preferred), 1072
 - STAT1011 (preferred), 1012
- You should have taken the programming requirement (CSCI1120, 1510, 1520, 1530, 1540, PHYS2061 or ESSC2030) by the end of Year 2

Course Recommendations

	Term 1	Term 2	Remarks
Faculty Packages + CS	Physics, Chemistry, Statistics, Mathematics, Computer Science		← year 1-2
FP : Physics	PHYS1111	PHYS1122	← year 1
FP : Mathematics	MATH1010	MATH2550	← year 1
ESSC Year 1	ESSC1000	ESSC2010	← year 1
ESSC Year 2	ESSC2020	Other ESSC courses	← time clashes : always choose FP !

Golden Rules



- Finish as many 1000- and 2000-level courses as you can during Year 1 and 2!
- Always choose **FP** over other courses
- More time clashes will appear along the path

Requirements of Major Programmes



香港中文大學
The Chinese University of Hong Kong

MyCUHK | Library | CUHK A-Z | Giving to CUHK | Socializing CUHK | Shortcuts



Search



簡|繁

PROSPECTIVE STUDENT | **STUDENTS** | STAFF | ALUMNI | MEDIA | VISITORS

ABOUT CUHK | ADMISSIONS | COLLEGES | FACULTIES | TEACHING & LEARNING | RESEARCH & IMPACT | CAMPUS

1. <https://www.cuhk.edu.hk/>
2. → Students
3. → [Student Handbook](#)
4. Requirements of Major Programmes and Minor Programmes not listed under "Other Minor Programmes"
5. Browse Programme Information

*** Please check every year for the most updated version!

Browse Program Information

Academic Career: Undergraduate
Academic Year: 2021
Faculty: Faculty of Science
Study Mode: Full-time
Academic Program: (334 new curriculum) B.Sc. in Earth System Science

Academic Program (CHI):

Verification Code: HDRL

Refresh

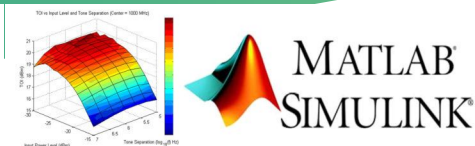
Search

Academic Career	Academic Year	Faculty Description	Study Mode	Academic Program	Academic Program (CHI)
UG	2021	Faculty of Science	Full-time	(334 new curriculum) B.Sc. in Earth System Science	(334新課程) 地球系統科學理學士

Diversified Teaching Modules | 多元教學

Diversified Teaching Modules | 多元教學

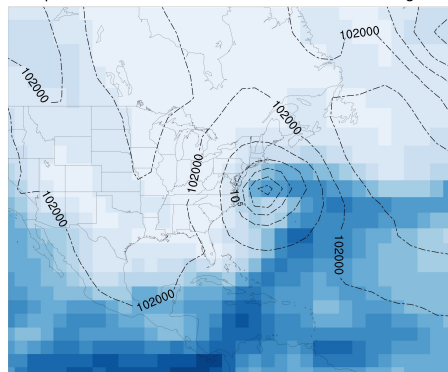
Computer Simulation & Visualization



2018010412

Precipitation

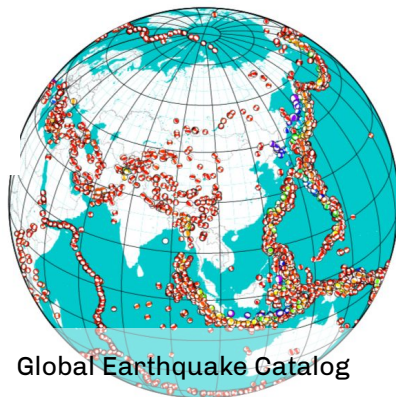
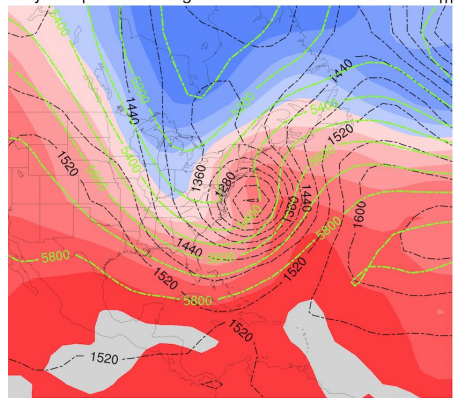
kg/m²



2018010412

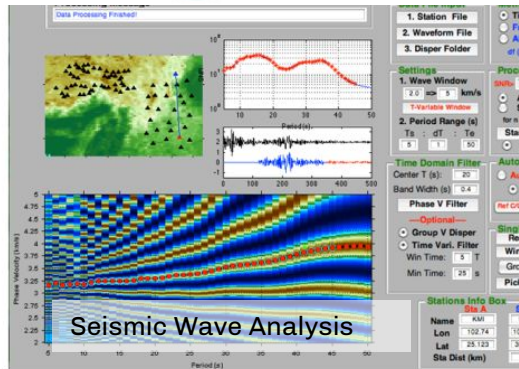
Geopotential Heights on Pressure Levels

m



Global Earthquake Catalog

Satellite Orbit Simulation

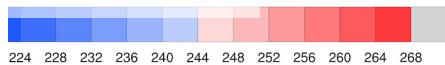


Seismic Wave Analysis



3D Model of The Gate 23

Visualization of Extratropical Cyclone

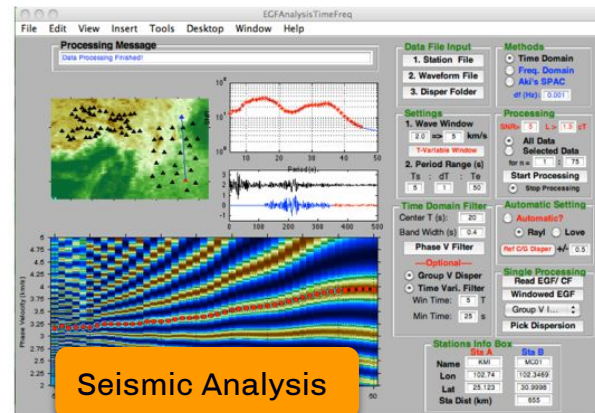
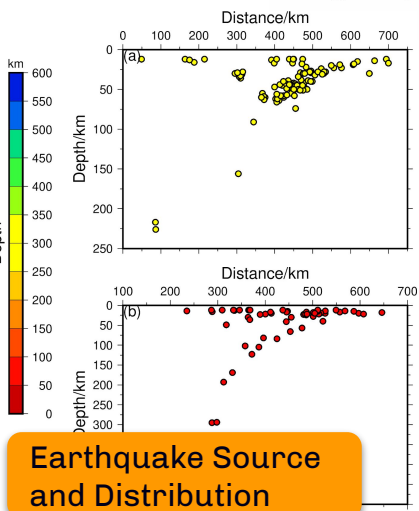
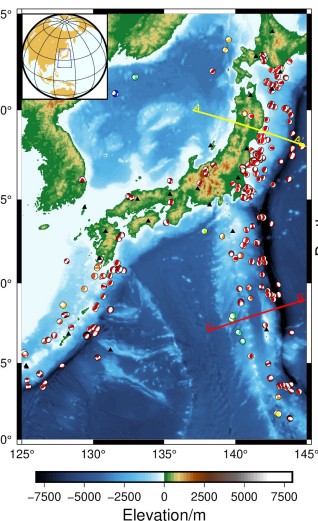
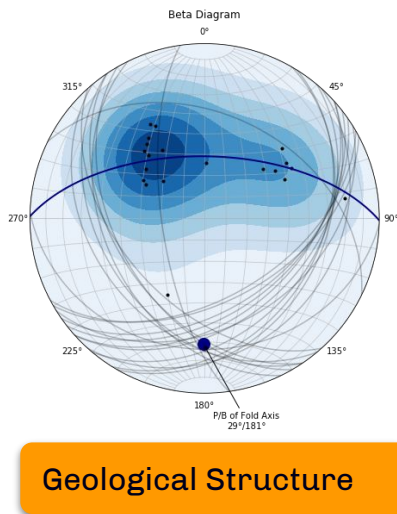
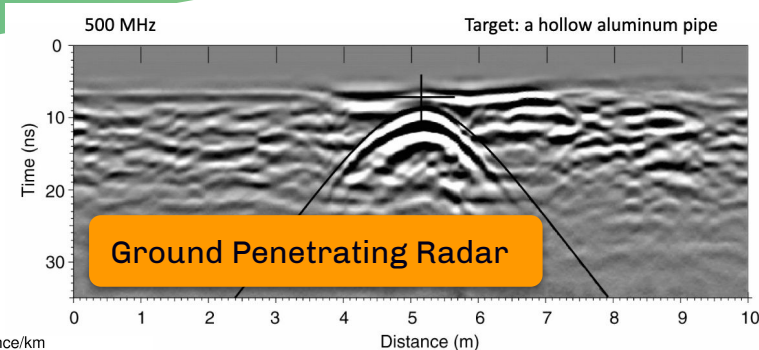
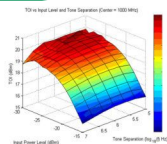


Diversified Teaching Modules | 多元教學

Applied Geophysics and Seismology

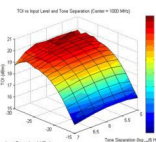


from field measurements

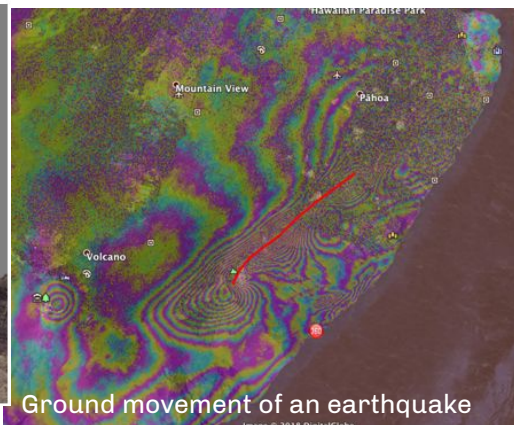


Diversified Teaching Modules | 多元教學

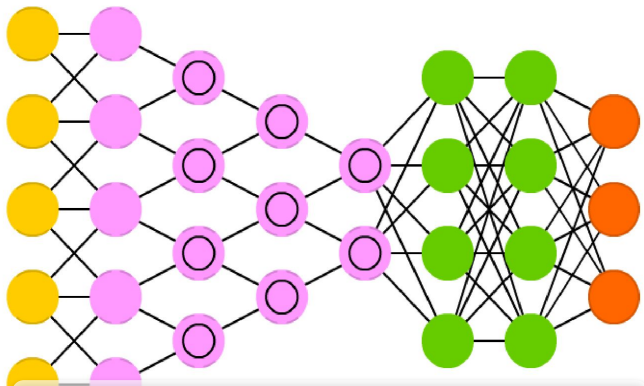
Remote Sensing



3D model of a tight fold in HK



Ground movement of an earthquake



Deep Learning and Artificial Intelligence



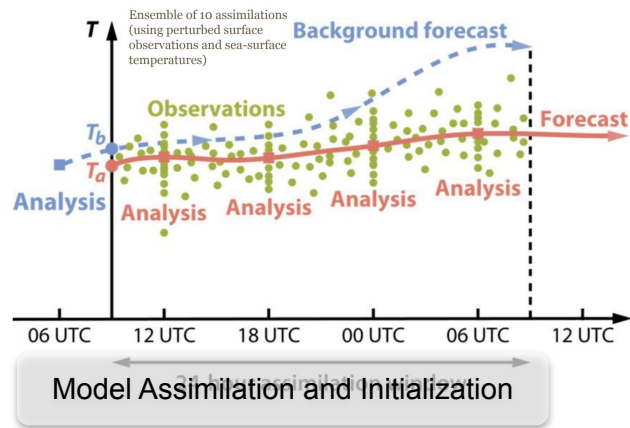
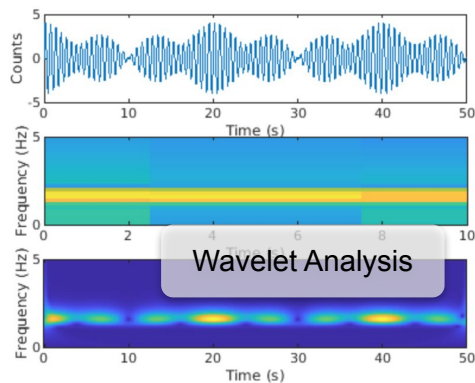
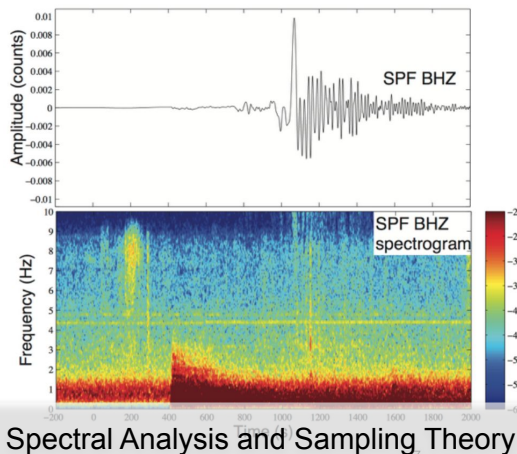
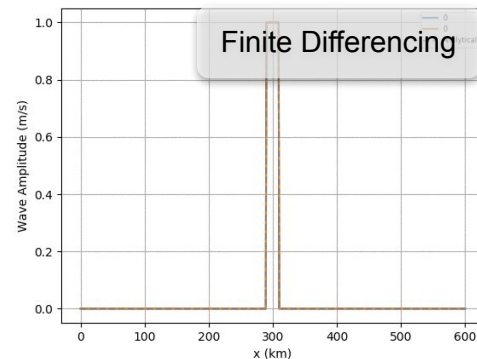
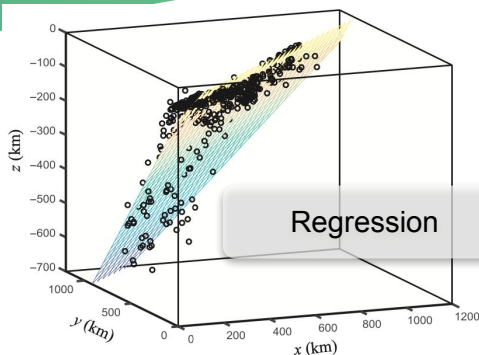
Infrared CUHK



UAV

Diversified Teaching Modules | 多元教學

Data Analysis and Numerical Modeling



Diversified Teaching Modules | 多元教學

Field Study



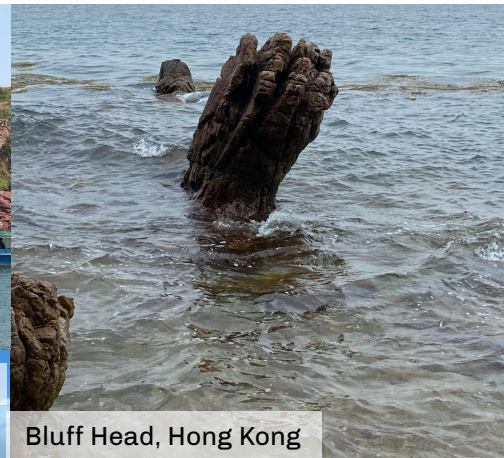
Yangtze River



Taroko National Park, Taiwan



Port Island, Hong Kong



Bluff Head, Hong Kong



Moon World Landscape Park, Taiwan



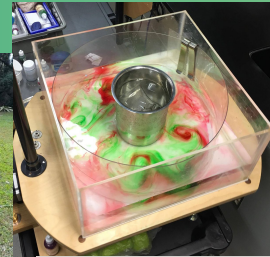
Cape D'Aguilar, Hong Kong



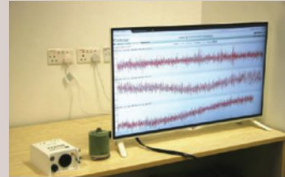
Hehuanshan, Taiwan

Diversified Teaching Modules | 多元教學

Laboratory & Experimental Study



Seismometer and a monitor showing real time ground velocities (ground movement) recorded



Weather in a Tank for geophysical fluid dynamics (GFD) experiment using a rotating tank



Petrographic Microscope for identifying rocks and minerals in thin sections

Diversified Teaching Modules | 多元教學

Elearning Module

<https://cuhkesscelearn.wixsite.com/home>



Earth System Science Programme

e-Learning Resource Pool

[Go to the Official Website of ESSC](#)

Home Video Resource Rocks & Minerals Gallery **KEEP Courses** Interactive Modules About us

Volcanoes [\(click here to start\)](#)



'Volcanoes' is one of the significant features on Earth. This module introduces volcanoes, with detailed explanations in their composition, formation, eruptive style, type, etc. We will also study some tectonic settings and magma. There will be interactive games and videos.
Course(s): ESSC2010

Petrology [\(click here to start\)](#)



This course will introduce you to the study of igneous, sedimentary and metamorphic rocks of the earth's crust and mantle. We will investigate the origin of the major groups of igneous, sedimentary and metamorphic rocks with an emphasis on the physical and chemical processes that give rise to these different rock types. In addition, corresponding tectonic settings and paleo-environments for these rocks will be studied. You will learn how to classify rocks based on rock-forming minerals in hand specimen and thin sections, as well as their textures and structures.
Course(s): ESSC4120

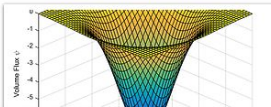
HK Geology [\(click here to start\)](#)



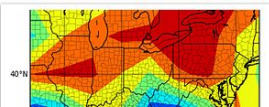
In this course, students can learn typical geological phenomenon in Hong Kong. A number of locations will be introduced, including the Bluff Head, Po Toi Island, Tung Ping Chau, High Island and Lai Chi Chong. The format is to watch the geological field trip videos and answer questions.
Course(s): ESSC1000, ESSC2010, ESSC3100

Geophysical Fluid Dynamics

[\(click here to start\)](#)



Getting Started with Python Programming in Earth System Science [\(click here to start\)](#)



Granite

A light-coloured, coarse-grained, igneous rock, consisting of essential quartz (at least 20%), alkali feldspar, mica (biotite and/or muscovite), with or more commonly without amphibole, and accessory apatite, magnetite, and sphene. Hyperaluminous granites are characterized by one type of alkali feldspar, usually microperthite, whereas subsolvus granites are characterized by two types of alkali feldspar: microperthite and albite. Granite can be formed by partialmelting of old continental crust, on a local scale by in situ replacement of continental crust (granitization), by fractional crystallization of basalt magma, or by a combination of these processes. — A Dictionary of Geology and Earth Sciences (4 ed), Oxford University Press



size: around 8 cm



Extracurricular Activities Exchange



2017 ESSC x Physics US Study Tour



Arctic Geology
Arctic Geophysics

The University Center in Svalbard (UNIS)



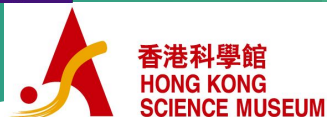
Paul YEUNG
2020 University of Bergen Exchange

Student Exchange Programme

- List of University that ESSC students have been admitted though Student Exchange Programme:

- University Centre in Svalbard (Norway)
 - University of Bergen (Norway)
 - KTH Royal Institute of Technology (Sweden)
 - University of Gothburg (Sweden)
 - Tecnologico de Monterrey (Mexico)
 - Queen's University (Canada)
 - American University (USA)
 - Boston College (USA)
 - University of California, Irvine (USA)
 - University of Copenhagen (Denmark)
 - University College Utrecht (The Netherlands)
 - Australian National University (Australia)
 - University of Helsinki (Finland)
 - University of Hawaii, Manoa (Hawaii)
 - Peking University, Beijing (China)
 - Hanyang University (Korea)
 - Nagoya University (Japan)
- and more...*

Extracurricular Activities Internship Opportunities



HKO, EPD, ClusterTech Limited

- Geophysical Research, Weather Forecast, Pollution Chemistry Modeling, Measuring Equipment Operations
- Model Simulation, Data Mining, AI

CEDD, Jacobs, CM Wong & Associated Limited, CH2M, EGS, Aurecon, AECOM, Meinhardt, Georisk, LAM Geotechnics Ltd., ESRI

- Geotechnical and geoscience

Incorporated Research Institutions for Seismology

- Research Institute

Hong Kong Science Museum

Jockey Club Museum of Climate Change - 賽馬會氣候變化博物館

ELITE, CUHK

2019 Hong Kong Observatory Internships
(9 ESSC students)



Extracurricular Activities

Internship Opportunities

- **List of companies collaborating Final-Year Projects with ESSC:**

- Geotechnical Engineering Office
- Ove Arup & Partners Hong Kong Limited
- Fugro (Hong Kong) Limited
- Hong Kong Observatory
- Environmental Protection Department

- **List of companies offering internship to ESSC students:**

- Geotechnical Engineering Office
- EGS (Asia) Limited
- Meinhardt
- AECOM
- Aurecon
- CH2M
- CM Wong & Associate Limited
- Georisks
- LAM Geotechnics Limited
- Esri
- Hong Kong Observatory
- Environmental Protection Department
- Hong Kong Science Museum
- ELITE, CUHK

Extracurricular Activities

Undergraduate Research Programme

Students are always welcome to join
Summer or Year Long Research Internships



Prof. Yen Joe TAN 陳衍佐
Ph.D., Geophysics, Columbia University
Research Fields

- Volcanic eruption dynamics
- Induced and triggered earthquakes

Email yjt@stanford.edu

- Seismic imaging and monitoring with ambient noise
- Machine learning and data science



Prof. Teng-fong WONG 黃庭芳
Ph.D., Geophysics, Massachusetts Institute of Technology
Research Fields

- Experimental rock deformation
- Earthquake mechanics

Email tfwong@cuhk.edu.hk

- Rock physics applied to energy resources
- Environmental hydrogeology



Prof. Hongfeng YANG 楊宏峰
Ph.D., Seismology, Saint Louis University
Research Fields

- Subduction zone dynamics and megathrust earthquakes
- High-resolution imaging of crustal fault zones and subsurface structure
- Earthquake detection and location

Email hyang@cuhk.edu.hk

- Earthquake source mechanics



Prof. Man Nin CHAN 陳文年
Ph.D., Environmental Science and Engineering, California Institute of Technology
Research Fields

- Aerosol physics and chemistry
- Chemical ageing of organic aerosol

Email mnchan@cuhk.edu.hk

- Multiphase, heterogeneous oxidative chemistry and kinetics
- Ambient pressure soft ionization (Direct Analysis in Real Time, DART)



Prof. Lin LIU 劉琳
Ph.D., Geophysics, University of Colorado at Boulder
Research Fields

- Cryosphere geophysics
- Remote sensing

Email liulin@cuhk.edu.hk

- Geodesy and near surface geophysics
- Deep Learning applications in Earth system science



Prof. Amos P. K. TAI 戴沛權
Ph.D., Engineering Sciences (Environmental Science and Engineering), Harvard University
Research Fields

- Atmosphere chemistry and physics
- Interactions between climate, ecosystems, and atmospheric composition
- Impacts of global environmental change on public health, agriculture and poverty

Email amostai@cuhk.edu.hk

- Air pollution, climate change, and land use change
- Atmospheric composition



Prof. Francis C. Y. TAM 譚志勇
Ph.D., Atmospheric and Oceanic Sciences, Princeton University
Research Fields

- Climate dynamics, tropical meteorology
- Impact of climate change

Email Francis.Tam@cuhk.edu.hk

- Seasonal climate prediction
- Statistical and dynamical downscaling

Extracurricular Activities Ambassadors

**Atmospheric Science
Ambassadors**



**Atmospheric Science
Ambassadors**



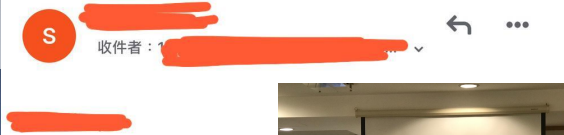
**Geoscience
Ambassadors**



**Geoscience
Ambassadors**



[Result] Team Award Application -
Leung Hung Kee General Education
Scholarship for Sustainable
Development Goals 2020-21 收件箱



Thank you and your team for a
scholarship. After careful delibe
panel members, I am writing to
awarded the team scholarship for recognition of your
contribution towards the SDGs. It is hoped that the



**Geoscience
Ambassadors**



ent for your future
SDGs in your daily
the scholarship
might be invited to
achieved.

o you and your

**Geoscience
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Products by Geoscience Ambassadors

Online workshops

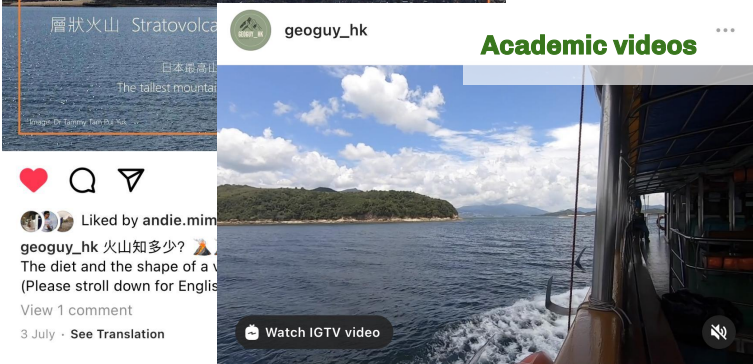
The screenshot shows two windows from an online workshop. The left window displays the 'Hong Kong Geological Time Scale' from the Geological Society of Hong Kong. It includes a vertical scale with geological periods and a table of geological units. The right window shows a close-up of a rock sample with a white mineral inclusion circled in red. A video call interface is visible on the right side of the workshop.

Unit	Symbol	Age (Ma)
Quaternary	Q	0.00 - 0.01
Recent	R	0.00 - 0.01
Holocene	H	0.00 - 0.01
Upper Pleistocene	UP	0.01 - 0.02
Lower Pleistocene	LP	0.02 - 0.05
Upper Pleistocene	UP	0.05 - 0.10
Lower Pleistocene	LP	0.10 - 0.20
Upper Pleistocene	UP	0.20 - 0.30
Lower Pleistocene	LP	0.30 - 0.40
Upper Pleistocene	UP	0.40 - 0.50
Lower Pleistocene	LP	0.50 - 0.60
Upper Pleistocene	UP	0.60 - 0.70
Lower Pleistocene	LP	0.70 - 0.80
Upper Pleistocene	UP	0.80 - 0.90
Lower Pleistocene	LP	0.90 - 1.00
Upper Pleistocene	UP	1.00 - 1.10
Lower Pleistocene	LP	1.10 - 1.20
Upper Pleistocene	UP	1.20 - 1.30
Lower Pleistocene	LP	1.30 - 1.40
Upper Pleistocene	UP	1.40 - 1.50
Lower Pleistocene	LP	1.50 - 1.60
Upper Pleistocene	UP	1.60 - 1.70
Lower Pleistocene	LP	1.70 - 1.80
Upper Pleistocene	UP	1.80 - 1.90
Lower Pleistocene	LP	1.90 - 2.00
Upper Pleistocene	UP	2.00 - 2.10
Lower Pleistocene	LP	2.10 - 2.20
Upper Pleistocene	UP	2.20 - 2.30
Lower Pleistocene	LP	2.30 - 2.40
Upper Pleistocene	UP	2.40 - 2.50
Lower Pleistocene	LP	2.50 - 2.60
Upper Pleistocene	UP	2.60 - 2.70
Lower Pleistocene	LP	2.70 - 2.80
Upper Pleistocene	UP	2.80 - 2.90
Lower Pleistocene	LP	2.90 - 3.00
Upper Pleistocene	UP	3.00 - 3.10
Lower Pleistocene	LP	3.10 - 3.20
Upper Pleistocene	UP	3.20 - 3.30
Lower Pleistocene	LP	3.30 - 3.40
Upper Pleistocene	UP	3.40 - 3.50
Lower Pleistocene	LP	3.50 - 3.60
Upper Pleistocene	UP	3.60 - 3.70
Lower Pleistocene	LP	3.70 - 3.80
Upper Pleistocene	UP	3.80 - 3.90
Lower Pleistocene	LP	3.90 - 4.00
Upper Pleistocene	UP	4.00 - 4.10
Lower Pleistocene	LP	4.10 - 4.20
Upper Pleistocene	UP	4.20 - 4.30
Lower Pleistocene	LP	4.30 - 4.40
Upper Pleistocene	UP	4.40 - 4.50
Lower Pleistocene	LP	4.50 - 4.60
Upper Pleistocene	UP	4.60 - 4.70
Lower Pleistocene	LP	4.70 - 4.80
Upper Pleistocene	UP	4.80 - 4.90
Lower Pleistocene	LP	4.90 - 5.00
Upper Pleistocene	UP	5.00 - 5.10
Lower Pleistocene	LP	5.10 - 5.20
Upper Pleistocene	UP	5.20 - 5.30
Lower Pleistocene	LP	5.30 - 5.40
Upper Pleistocene	UP	5.40 - 5.50
Lower Pleistocene	LP	5.50 - 5.60
Upper Pleistocene	UP	5.60 - 5.70
Lower Pleistocene	LP	5.70 - 5.80
Upper Pleistocene	UP	5.80 - 5.90
Lower Pleistocene	LP	5.90 - 6.00
Upper Pleistocene	UP	6.00 - 6.10
Lower Pleistocene	LP	6.10 - 6.20
Upper Pleistocene	UP	6.20 - 6.30
Lower Pleistocene	LP	6.30 - 6.40
Upper Pleistocene	UP	6.40 - 6.50
Lower Pleistocene	LP	6.50 - 6.60
Upper Pleistocene	UP	6.60 - 6.70
Lower Pleistocene	LP	6.70 - 6.80
Upper Pleistocene	UP	6.80 - 6.90
Lower Pleistocene	LP	6.90 - 7.00
Upper Pleistocene	UP	7.00 - 7.10
Lower Pleistocene	LP	7.10 - 7.20
Upper Pleistocene	UP	7.20 - 7.30
Lower Pleistocene	LP	7.30 - 7.40
Upper Pleistocene	UP	7.40 - 7.50
Lower Pleistocene	LP	7.50 - 7.60
Upper Pleistocene	UP	7.60 - 7.70
Lower Pleistocene	LP	7.70 - 7.80
Upper Pleistocene	UP	7.80 - 7.90
Lower Pleistocene	LP	7.90 - 8.00
Upper Pleistocene	UP	8.00 - 8.10
Lower Pleistocene	LP	8.10 - 8.20
Upper Pleistocene	UP	8.20 - 8.30
Lower Pleistocene	LP	8.30 - 8.40
Upper Pleistocene	UP	8.40 - 8.50
Lower Pleistocene	LP	8.50 - 8.60
Upper Pleistocene	UP	8.60 - 8.70
Lower Pleistocene	LP	8.70 - 8.80
Upper Pleistocene	UP	8.80 - 8.90
Lower Pleistocene	LP	8.90 - 9.00
Upper Pleistocene	UP	9.00 - 9.10
Lower Pleistocene	LP	9.10 - 9.20
Upper Pleistocene	UP	9.20 - 9.30
Lower Pleistocene	LP	9.30 - 9.40
Upper Pleistocene	UP	9.40 - 9.50
Lower Pleistocene	LP	9.50 - 9.60
Upper Pleistocene	UP	9.60 - 9.70
Lower Pleistocene	LP	9.70 - 9.80
Upper Pleistocene	UP	9.80 - 9.90
Lower Pleistocene	LP	9.90 - 10.00

Field study



Products by Geoscience Ambassadors



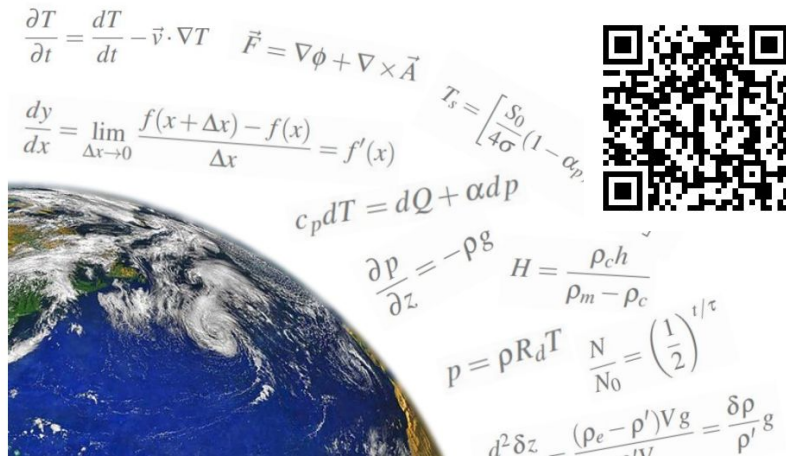
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 geoguy_hk 我同你出field Vol.4 · 荔枝莊 · 微斷層 · 粒漸層理 · 負載構造 · Geoscience Ambassador · ESSC · CUHK · <https://youtu.be/48i2wx7tdeM...> more
 31 July



Materials Developed by Students

Mathematical Handbook for Earth System Science

~ An introductory hands-on guide ~



ESSC Math Handbook by Benjamin Loi
<https://esscstudycenter.github.io/materials/Handbook.pdf>

ESSC Geoscience Study Info (*Unofficial*)

Last update: 2021/05

Geoscience and Relevant Course List

ESSC Geoscience Study Subfield

ESSC Math Training Pathway (Optional)

Tentative ESSC Geoscience Course Schedule 2020-2022

Course Introduction

- ESSC4020 Rock and Soil Mechanics
- ESSC4180 Earthquake Source Physics
- ESSC4601 Research Seminar in Earth System Science
- ESSC4602 Volcanoes: Formation, Unrest, and Eruption

Career Aspect

- Geotechnical Industry Requirement
- Internship Opportunities
 - ESSC Internal Internship/ Learning Opportunities:
 - Company Internship/ Job opportunities
- Postgraduate Study

Contact Dr Tammy or [Jeremy](#) for any enquiries

Geo- course selection guide by Jeremy Wong

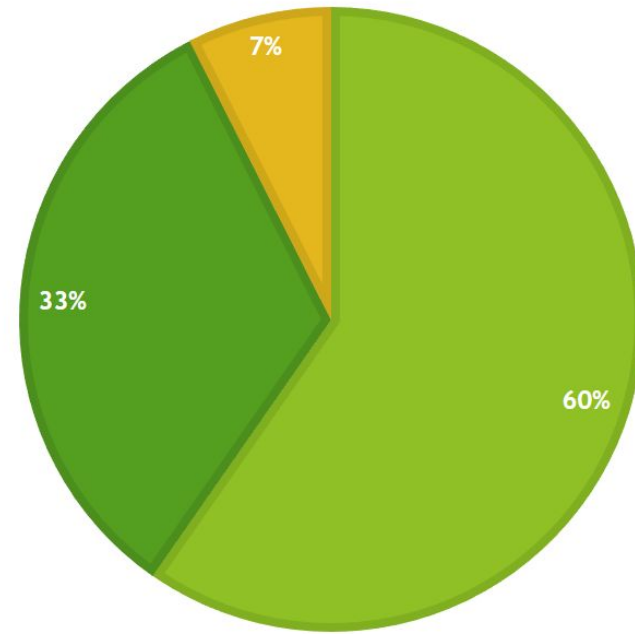
https://drive.google.com/file/d/16q2B3QH7h2d1_RKWP_K17EvkmVym8sVj/view?usp=sharing



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ESSC Graduate Employment Status

■ Response Rate: 73%



■ Full-time employed ■ Further studies ■ Others

ESSC Graduate Employment Status

- Hong Kong Government
 - Department such as Architectural Services, Environmental Protection, Hong Kong Observatory
 - Technical Officers Trainee, Experiment Officer, Outreaching Coordinator
- Company / Industry
 - Companies such as Arup, EGS, Fugro, Tysan, Ambit Geospatial Solution, BGCA 香港小童群益會, Cathay Pacific, CLP 中電, HKT 香港電訊, The Salvation Army 救世軍, Viu (PCCW)
 - Assistant Geologist, Project Engineer, Software Engineer, Data Scientist, Data Analyst, Editor
- Education
 - Junior Research Assistant in University
 - Teacher in Primary School and Secondary School
- Further Studies
 - MPhil or PhD Programme in Hong Kong or overseas such as UK, USA, Australia, Germany, Switzerland, Japan, etc.

and more...

“The Earth is what we all have in common.”



Thank you for listening!

Seismology 地震學

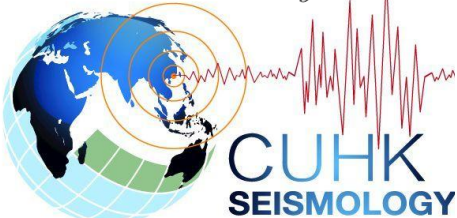
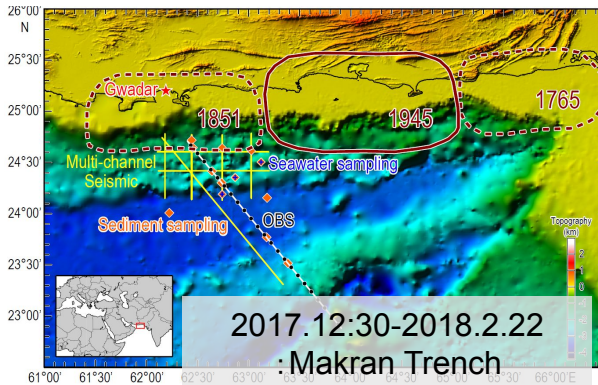
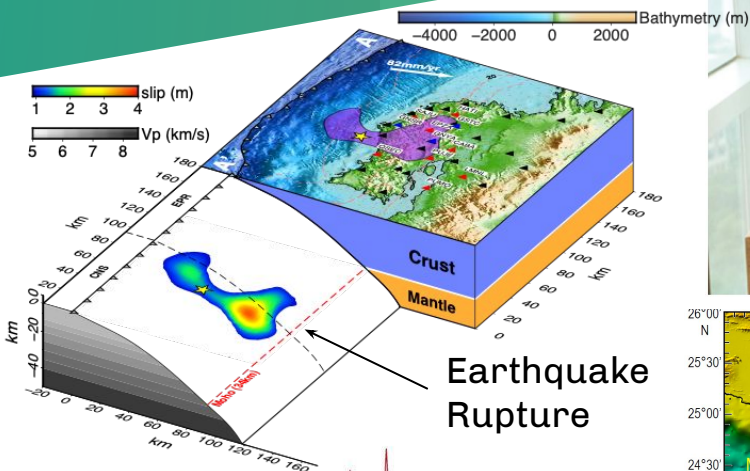
Professor YANG Hongfeng &
Professor WONG Teng Fong
Earth System Science Programme



中巴科学家给莫克兰海沟“CT扫描”



1月26日,香港中文大学杨宏峰教授在“实验3”号科考船上工作。
莫克兰海沟是阿拉伯板块、印度板块和欧亚板块的汇聚地带。近一周,中国和巴基斯坦科学家正在进行首次北印度洋联合考察,在莫克兰海沟持续开展多地震实验。
新华社记者 张建松摄



Remote Sensing in Earth Science

遙感應用於地球科學

Professor LIU Lin
Earth System Science Programme

■中大教授劉琳遠赴位於北極的格陵蘭島，考察冰川融化情況。

港專家冰川考察

拆解氣候炸彈 北極

新聞故事 極地救兵

高溫屢創新高，全球暖化危機加深。

中大教授劉琳聯同一班科學家化身「氣候戰士」，

傾盡六年的時光，研究世界最大的島嶼、北極圈的格陵蘭島冰川融化的危機。透過觀察衛星圖像變化，他發現格陵蘭島最後一片穩定的東北冰川，十年來以驚人速度大量消融，更有「崩塌危機」，隨時全部崩落海中成為「氣候炸彈」。

記者 麥凱淇

位於北極圈內的格陵蘭，是全球最大的島嶼，亦是繼南極洲後，全球第二大冰川，一直以來被視為全球暖化的指標。格陵蘭冰川出現融化危機，「過去二十年，全球海平面過去上升了三點二毫米，其中約六分之一的海水是來自格陵蘭冰川。假如格陵蘭冰川全部消融，全球海平面會上升六米。我們首次發現，格陵蘭最後一片穩定的東北冰川，可能隨時崩塌。」中大教授劉琳說。劉琳與來自五個國家的十三位科學家，六年來用不同的方式觀察格陵蘭冰川的變化，他主力透過衛星雷達的影像，觀察冰川的流動，「我每月都會拍攝格陵蘭冰川的衛星照片，仔細比較冰川的流動距離，發現冰川在的流速在過去十年，從五百米加速至六百米。換言之，冰片正在不斷消失。另一方面，十幾公厘厚的冰川，從二〇〇三年每年遞減一米，現加速至二〇〇六年起，每年遞減五米。」

劉琳說，格陵蘭島的氣候近年顯著變化，東北冰川更有可能隨時局部崩塌及崩陷。

冰川不但按年遞減，更有可能一瞬間內全部崩落瓦解，「冰川底部開始消融，大量的海水存於冰川之下，令冰川前端浮在水面，整個冰川變得不穩定，有可能整塊崩塌，誰也不知道這情況會否在短時間內出現，這是個未知的問題，令人擔憂。」

劉琳說，過去五十年，北極暖化加劇，不但加速冰川融化，亦令北極生態大受影響，「原本冰可以反射太陽的輻射，但冰川融化後，原來冰的位置變成海水，直接吸收太陽的熱力，海水受熱膨脹後，水平面上升，加劇北極暖化，北極熊無可避免受影響。我們科學家都很驚訝北極的氣候及生態正快速改變。」

監察青藏冰川變化

從事冰川研究多年的劉琳，有科學家的使命感，希望科學的方法有助解決氣候問題，「全球暖化的問題嚴重，身為科學家，我也想透過研究去尋找解決的方法。近年，不同的科學家正努力試驗，想出不同的方法。除了繼續留意格陵蘭冰川，他正致力研究青藏高原上五萬塊冰川的變化，他說：「冰川的研究非常有意思，對人類有作用。近年青藏高原的冰川亦有顯著的變化，而這五萬塊冰川，每個的變化不一，很多未知的因素包含其中。」

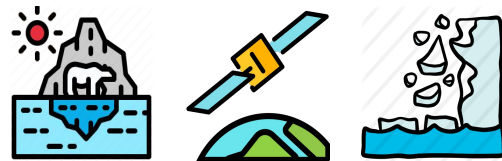


格陵蘭冰川專家劉琳警告 地球數十年內進入新狀態



[放大圖片 / 顯示原圖](#)

全球暖化加劇，氣候轉變愈來愈明顯，長年被嚴寒冰封的極地，影響尤其巨大，北極海冰最快在15年後的夏天完全消融，而擁有全球第二大冰蓋的格陵蘭，其冰川的消融速度也不斷加劇，有美國科學家團隊對比數十年的數據，總結當地冰川變化已遠無法逆轉水平，如果不控制，預計在3000年當地冰川將完全融化。極地雖香港遙遠，...



Volcano Geophysics

火山地球物理學



NATIONAL
GEOGRAPHIC



Lava formed glassy pillow-like structures on the seafloor during a 2015 eruption on Axial Seamount off the Oregon coast.

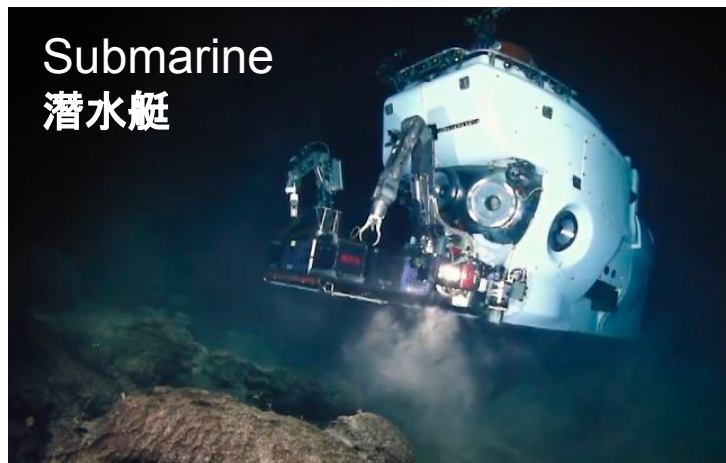
PHOTOGRAPH BY UNIVERSITY OF WASHINGTON

Underwater Volcano Offers Rare Look at Eruption in Real Time

Professor TAN Yen Joe
Earth System Science Programme



Submarine 潛水艇



Atmosphere-Biosphere Interactions

大氣圈與生物圈的關係

Professor Amos TAI
Earth System Science Programme

Director of the Observatory presented the Research Award for Young Scientists 2015 on behalf of the World Meteorological Organization

Tuesday, 1st September 2015

世界氣象組織青年科學家研究獎
首位香港得獎者



即時新聞 港聞 選擇分類

中大研「間套作」耕種法 增收成減污染

2019-04-25 07:07 文字大小



種樹要揀低排量



■研究指香港市花洋紫荊釋放最多有機化合物。

香港文匯報訊（記者 鄭伊莎）雖然植物可吸收地表臭氧濃度，有助好減空氣污染，不過，中大地球系統科學課程助理教

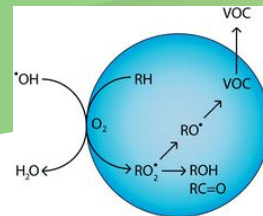
戴沛權教授主力結合高性能地球系統模擬及創新的多元統計方法，深入了解農業、陸地生態系統與大氣環境之間的相互作用，並以跨學科角度解決與之迫切相關的環境問題

- 氣候、植被與土地利用的變化會怎樣影響天氣現象及空氣污染的程度？
- 如何改善農業、森林管理模式及人類飲食習慣來緩減空氣污染和氣候變化？



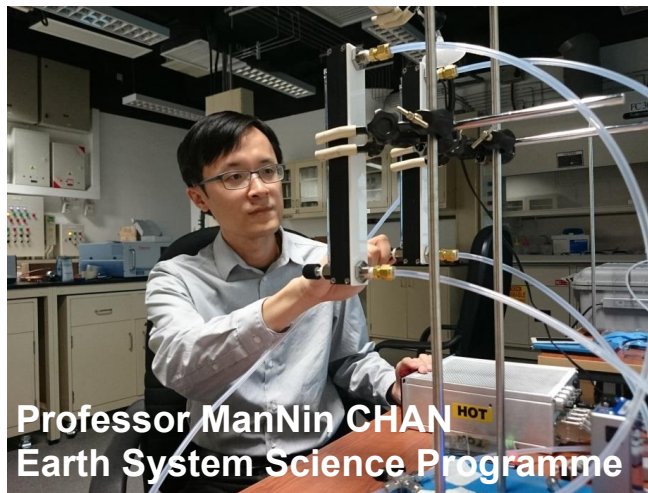
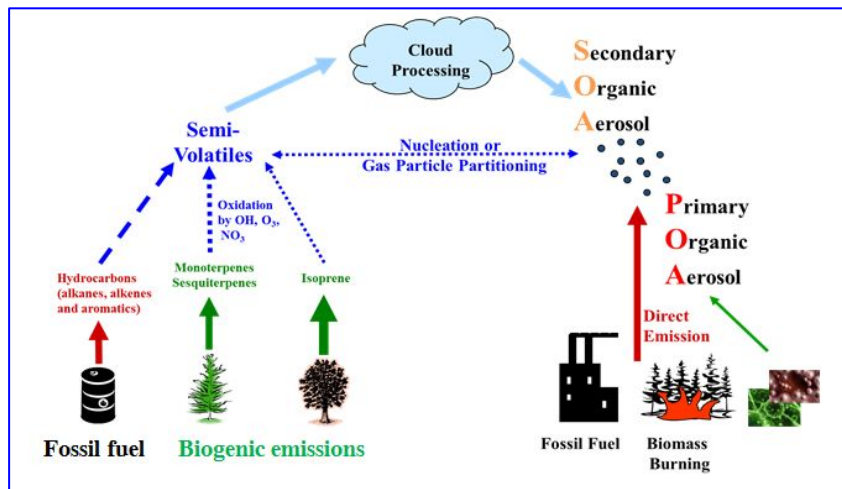
Atmospheric Science : Research in Aerosols

大氣科學：氣溶膠研究



陳文年教授主力研究大氣懸浮粒子的來源、其形成方式和化學成份，並探究浮質結構的改變。他的實驗室除了運用不同的光譜技術來分析氣溶膠的成份外，也會利用科學分析技術去即時偵測它們的成份。簡單來說，就是先把氣溶膠轉化為氣態，經離子化後就可以分析它的成份。

知道氣溶膠的成份後就可以對症下藥，作針對性的減排了！



中大研城市化氣候變化影響 冀聯天文台「狙擊」極端天氣
暴雨增密 港變澤港

編按：氣候變化是本世紀人類面臨的最大挑戰。化石燃料的使用令溫室氣體過度排放，加上森林遭破壞，打破了氣候的微妙平衡，可能對人類和環境帶來災難性衝擊。各國領袖明日起將齊聚法國巴黎，舉行聯合國氣候變化峰會，希望能定下減排目標，緩和氣候的不尋常變化。此次峰會受到高度重視，事實上面對全球性氣候問題，香港不可能獨善其身，為此本港科研人員積極投入，以科學的力量走上面對氣候變化的前線。本報今日起推出系列報道，從極端天氣、生態環境、海平面上升和監察警示等方面，讓香港科學家以其第一手的研究資料，與讀者一同分析探究氣候變化對香港以至鄰近地區的影響，期望喚起大眾更廣泛關注。

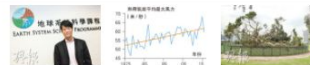


Professor Francis TAM Earth System Science Programme

環保意識：減碳救地球 防止風暴增強



圖3-1-譚志勇 (呂雄宗攝)



【明報專訊】經歷過「天鴿」和「山竹」，不少人覺得吹襲本港的風暴愈來愈猛烈，真有其事嗎？「香港是個小地區，研究風暴不能只看本港，要把視野擴闊至中國沿岸，甚至整個西太平洋和地球。」香港中文大學理學院地球系統科學課程副教授譚志勇說，襲港的熱帶氣旋主要在西太平洋形成，區域內熱帶風暴或以上強度等級的熱帶氣旋風力，在1975至2015年期間確實有增強趨勢，平均最大風力由1975年約每秒50至55米，到2015年增加至每秒65至70米（見圖）。

