International Astronomical Union
Union Astronomique Internationale

POST MEETING REPORT FORM

ANNEX : Symposium # 374 "Astronomical hazards for life on Earth"

(i) Scientific programme

Daily Schedule [Symposia #374 Astronomical hazards for life on Earth]
Time in Korea Local Time UT+9 hours

Session IAUS#374
Date Aug. 9

Time (KST, GMT+9)	Program	Chair	Category	Speakers		Type of Participation
				Name	Title	
08:15-09:45	Plenary Lecture		Plenary			
09:45-10:30	Morning e-Poster					
10:30-12:00	Morning Oral Session	Gonzalo Tancredi	Invited	Jeffrey Love	Down to Earth with geoelectric hazards from space	Remote
			Contributed	Ihor Kyrylenko	Orbit and dynamic origin of the recently recovered iron meteorite	Remote
			Contributed	Gulchehra Kokhirova	Asteroid Apophis and its associated fireballs	In-room
			Contributed	Svitlana Kolomiyets	The meteoroid component of the astronomical hazard to Life on Earth: contribution, relationships and more	Recorded
12:00-13:30	Lunch					
13:30-15:00	Afternoon Oral Session 1	Simone Ieva	Invited	Brent Barbee	The Opportunity to Defend Ourselves Against Near-Earth Object Impact Threats	Remote
			Contributed	Richard Wainscoat	The Pan-STARRS search for Near-Earth Objects (NEOs)	Remote
			Contributed	Suresh Bhattarai/Manis	Asteroid Search Program: An Initiative To Engage People for The Protection of Planet Earth	In-room
			Contributed	Xuguang Leng	Jupiter and Evolution of Complex Life on Earth	Remote
15:00-15:15	Break					
15:15-16:45	Afternoon Oral Session 2	James Bauer	Contributed	Patrick Michel	The ESA Hera mission to the binary asteroid Didymos: NEO deflection investigation and full characterization	Remote
			Contributed	Thomas Statler	After DART: Informing a Hypothetical Future Asteroid Deflection with Results from the First Kinetic Impactor Test	In-room
			Contributed	Vasiliki Petropoulou	The EU H2020 project "NEOROCKS -The NEO Rapid Observation, Characterization and Key Simulations"	Remote
			Contributed	Simone Ieva	Observational characterization for the Didymos system in support of the DART & LICIACube mission, the first kinetic impactor demonstration	In-room
			Contributed	Elisabetta Dotto	LICIACube: the Light Italian Cubesat for Imaging of Asteroids part of the NASA mission DART	Remote
16:45-17:30	Afternoon e-Poster					

Date Aug. 10

Time (KST, GMT+9)	Program	Chair	Category	Speakers		Type of Participation
				Name	Title	
08:15-09:45	Plenary Lecture		Plenary			
09:45-10:30	Morning e-Poster					
10:30-12:00	Morning Oral Session	Gulchehra Kokhirova	Invited	Rosita Kokotanekova	We do look up: what cometary science has revealed about the potential hazards of comet and interstellar object impacts	Remote
			Contributed	Makoto Yoshikawa	Planetary defense activities at JAXA	Remote
			Contributed	James (Gerbs) Bauer	The Many Comets of NEOWISE	In-room
			Contributed	Camilo Delgado-Correa	Optimization of Gauss Method to describe with most accuracy the orbits of Near Earth Asteroids - NEAs	In-room
12:00-13:30	Lunch					
13:30-15:00	Afternoon Oral Session 1	Gijs Verdoes Kleijn	Invited	Heidi Korhonen	Solar hazards on different time scales	In-room
			Contributed	Eva Villaver	The Fate of planet Earth	Cancelled
			Invited	Brian Thomas	The Supernova Threat to Life in the Universe	Remote
			Contributed	Ammar Abdulla	Lunar Impact Events by SLIO in 2020	In-room
15:00-15:15	Break					
15:15-16:45	Afternoon Oral Session 2	Heidi Korhonen	Invited	Christopher Impey	How It Ends	Remote/e-talk
			Invited	Coryn Bailer-Jones	Close stellar encounters with the Sun	Remote
			Contributed	Gijs Verdoes Kleijn	Piggybacking astronomical hazard investigations on research and development for Big Data science missions	In-room
			Contributed	Teymoor Saifollahi	Are we safe? Precovery and risk assessment of the hazardous Near-Earth Objects	In-room
16:45-17:30	Afternoon e-Poster					

Date Aug. 11

Time (KST, GMT+9)	Program	Chair	Category	Speakers		Type of Participation
				Name	Title	
08:15-09:45	Plenary Lecture	Gonzalo Tancredi	Plenary	Milan Cirkovic	Rare Earth Got It Wrong: Astronomical Hazards and Habitability	Remote
09:45-10:30	Morning e-Poster					
10:30-12:00	Morning Oral Session	Gonzalo Tancredi	Contributed	Gonzalo Tancredi	What catastrophes of extraterrestrial origin can affect us on various geographical and temporal scales?	In-room
			Contributed	Milan Cirkovic, Patrick Michel, Heidi Korhonen, Brian Thomas, Jeffrey Love. Moderator: Gonzalo Tancredi	Round Table #1: Comparative analysis of the astronomical hazards	In-room
12:00-13:30	Lunch					
13:30-15:00	Afternoon Oral Session 1	Gonzalo Tancredi	Invited	Organizing Committee:	International Year of Planetary Defence	Remote
			Contributed	Thomas Statler, Christopher Impey, Brent Barbee, Rosita Kokotanekova, Doris Daou, Romana Kofler. Moderator: Gonzalo Tancredi	Round Table #2: Dealing with the hazards: the role of scientists, public, media and decision makers	In-room

e-posters and e-talks

Name	Abs_no.	Title	Type of Participation
Gulchehra Kokhirova	345	On a nature of active asteroid Don Quixote by observations at the Sanglokh observatory	e-Poster
Eduard Kuznetsov	609	Dynamic and physical parameters of near-Earth asteroids from the observations	e-Poster
Boris Shustov	877	Time scale of the dynamic evolution of the NEA population: dependence on the initial orbital parameters	e-Poster
Joseph Masiero	1290	NEOWISE characterization of hazardous asteroids	e-Poster
Christopher Impey	1306	How It Ends	e-Talk/Remote
Sun Mie Park	1615	Ionospheric disturbances related to large earthquakes in North America as observed by TEC during the solar minimum	e-Poster
Fabrizio Bernardi	1620	New Priority List for Near Earth Objects Follow-up and prompt orbit improvement	e-Talk
Anne-Charlotte Perlbarg	1666	NAROO Program - Precovery observations of Potentially Hazardous Asteroids	e-Poster
Anne-Charlotte Perlbarg	1667	NAROO Program - Precovery observations of Potentially Hazardous Asteroids	e-Talk
Supachai Awiphan	1920	How safe is Earth from long-range detection by other civilisations in the Milky way galaxy through photometric microlensing?	e-Poster
Roman Zolotarev	2316	On the mass indices of meteor bodies	e-Poster
Remziye Canbay	2940	Determination of Orbital Elements of Asteroids and Gaia Astrometry	e-Poster
Coryn Bailer-Jones	2958	Close stellar encounters with the Sun	e-Talk/Remote
Sergei Ipatov	3066	Migration of bodies to the Earth from different distances from the Sun	e-Talk
Gonzalo Tancredi	3288	The International Year of Planetary Defense, 2029	e-Talk/Remote
Birgit Loibnegger	3386	Is the fly-by of Gliese710 a hazard for the Solar system?	e-Poster
Yudish Ramanjooloo	3388	The Earth-Impact Risk of Manx Comets	e-Poster

Invited talks:

Jeffrey Love
Brent Barbee
Rosita Kokotanekova
Heidi Korhonen
Brian Thomas
Christopher Impey
Coryn Bailer-Jones

Contributed talks

Ihor Kyrylenko	Simone Ieva
Gulchehra Kokhirova	Elisabetta Dotto
Svitlana Kolomiyets	Makoto Yoshikawa
Richard Wainscoat	James Bauer
Suresh Bhattarai/Manisha Dwa	Camilo Delgado-Correal
Xuguang Leng	Ammar Abdulla
Patrick Michel	Gijs Verdoes Kleijn
Thomas Statler	Teymoor Saifollahi
Vasiliki Petropoulou	

e-Poster and e-Talks

Gulchehra Kokhirova	Roman Zolotarev
Eduard Kuznetsov	Remziye Canbay
Boris Shustov	Coryn Bailer-Jones
Joseph Masiero	Sergei Ipatov
Sun Mie Park	Gonzalo Tancredi
Fabrizio Bernardi	Birgit Loibnegger
Anne-Charlotte Perlbarg	Yudish Ramanjooloo
Supachai Awiphan	

Session Chairs

Gonzalo Tancredi - male
Simone Ieva - male
James Bauer - male
Gulchehra Kokhirova - female
Gijs Verdoes Kleijn - male
Heidi Korhonen - female

In addition, should also provide the number of:

- invited talks: female – 2 / male - 6
- invited speakers accepted: female – 2 / male - 6
- contributed talks: female 4 /male 13
- session chairs: female – 2 / male - 4

The ratio female/male ratio of invited speakers is like the ratio in contributed talks.

(ii) Summary of the scientific highlights of the meeting

The end of humanity has been a topic of great concern across ages and civilizations. This is reflected in the wealth of references throughout many cultures and religions. Over the last several decades, studies have allowed us to better understand the most likely threats to life on Earth, both in the past and the future. This symposium focused on a comparative analysis of natural threats, caused by astronomical phenomena, which could lead to a new extinction, and not the anthropic causes. Current and future mitigation strategies were also be discussed.

During the Symposium, we covered several potential hazards caused by astronomical phenomena. Thus, this is multi- and cross-disciplinary topic, encompassing almost all IAU Divisions.

Although the problem of astronomical risks for life on Earth has been a matter of concern to some IAU bodies, such as the WG Near Earth Objects, or Commission E3 Solar Impact Throughout the Heliosphere and Inter-Division E-F-G Commission Impact of Magnetic Activity on Solar and Stellar Environments, is the first time that scientists from various Divisions meet to analyze the problem as a whole.

The symposium was organized in different sessions, devoted to the following topics:
- Terrestrial hazards: Earth magnetic field
- Planetary hazards: asteroid and comet impacts, rogue planets
- Solar hazards: solar activity, Sun evolution
- Galactic hazards: nearby stars, heliosphere, supernovae, GRBs, black holes
- Universal hazards: the fate of the Universe

An important part of the presentations were associated with the risk of impact of asteroids and comets against the Earth, and its consequences; nevertheless, there were also presentations on solar hazards, the supernovae threat, stellar close encounters, and the fate of the Universe.

There were two Round Tables with the participation of several of the invited speakers. The first one was on "Comparative analysis of the astronomical hazards". The different threats were analyzed in comparative terms, assessing the relevance of each one of them. The participants also discussed the mitigation actions that humanity has been developing to face these problems.

The second Round Table was titled: "Dealing with the hazards: the role of scientists, public, media and decision makers". The initiative promoted by a group of colleagues of various nationalities and expertise to propose the declaration of 2029 as the International Year of Planetary Defense, by the UN, was publicly presented for the first time. The difficult dialogue between the scientific community, the public, the press and decision makers in the face of a specific threat was analyzed.

Unfortunately, due to the health situation, in which travel was still highly restricted, and the time difference with the Western Hemisphere, the number of in-room and remote participants was much lower than expected.

We hope that these topics can continue to be analyzed in inter-Divisions discussions within the IAU.

(v) An Executive Summary of the Meeting (1-2 pages) to be published on the IAU website.

Same as item (ii)