

ODAK2023

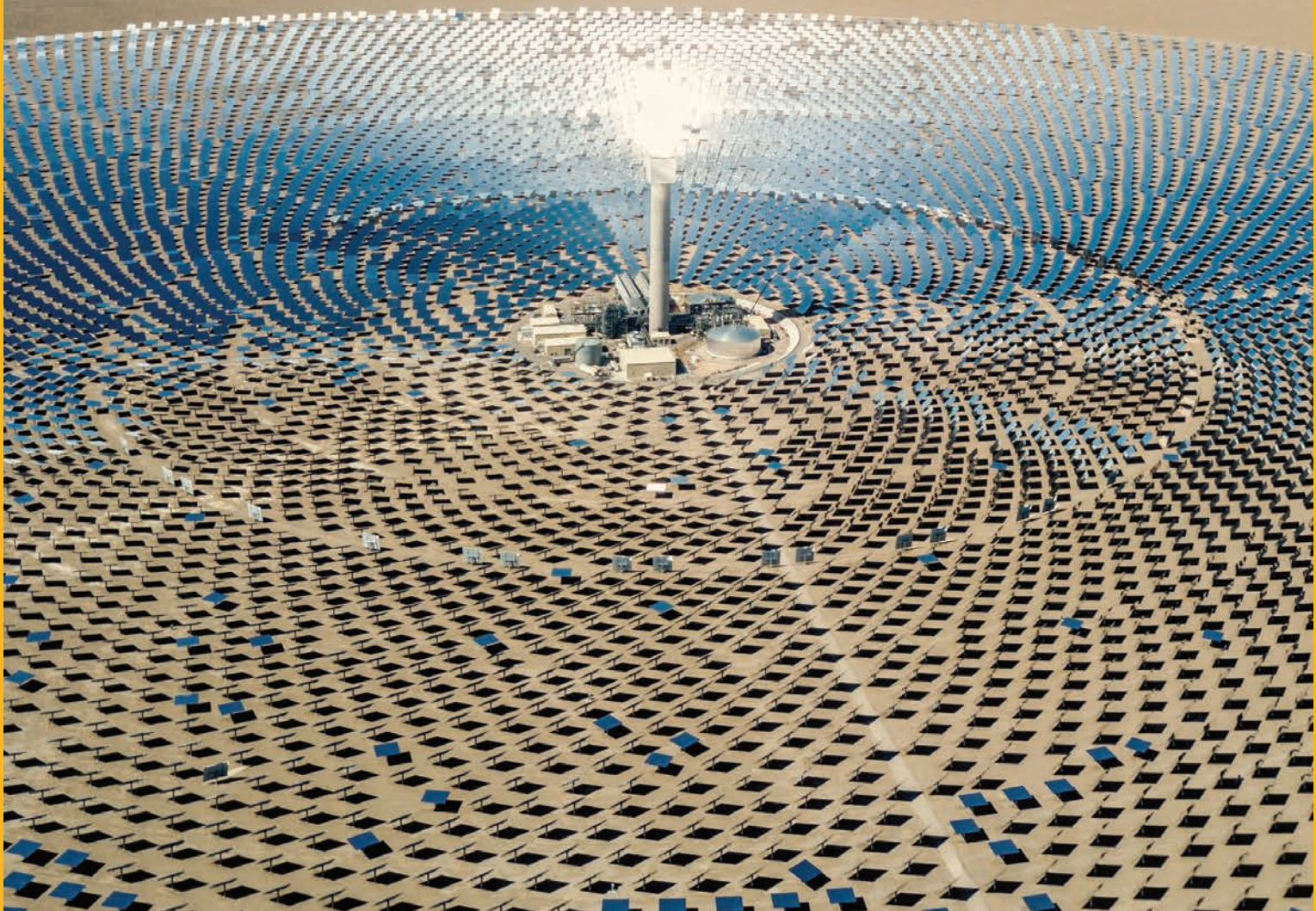
Kick-Off Event

Sunrise for
Concentrating Solar Thermal (CST)
in Turkey

26th February
2020

İkizler Building Conference Room

ODTÜ TeknoKent
Ankara, Turkey



Venue:

İkizler Building Conference Room
ODTÜ TeknoKent
Ankara, Turkey
39.8966 N, 32.7757 E

Registration:

No Registration Fee

Local Organizing Committee:

Prof. Dr. Derek BAKER (Chair), METU-GÜNAM
Dr. Yelda ERDEN-TOPAL (Vice-Chair), METU-TEKPOL
Prof. Dr. Burcu AKATA-KURÇ, Micro & Nano Tech., METU
Ass't. Prof. Dr. Zöhre KURT, Env. Engr., METU

Connect, Follow & Contact:

Derek BAKER: dbaker@metu.edu.tr

Yelda ERDEN-TOPAL: yeldae@metu.edu.tr

Registration

<https://forms.gle/oXBXLpvoHmcfgEMz9>

Google Maps

<https://goo.gl/maps/5NPAED8ug2yAtt8cA>

About Concentrating Solar Thermal (CST)

The value-chain covered by CST technologies is very large and covers the collection, storage, and end-use of concentrated solar thermal energy.

Concept: CST can be understood as taking a magnifying glass (Concentrator) on a sunny day and focusing the sun's rays to burn a dry leaf (Receiver). Typically in practice, relatively inexpensive reflective surfaces replace lenses for the concentrator.

Collection: CST collector technologies are generally classified into 4 categories.

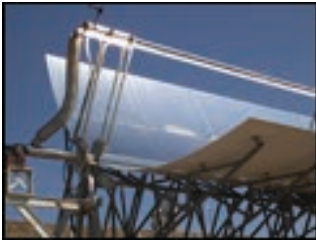
Four Main CST Collector Technologies



Parabolic Dish (PD)



Central Receiver (CR)



Parabolic Trough (PT)



Linear Fresnel (LF)

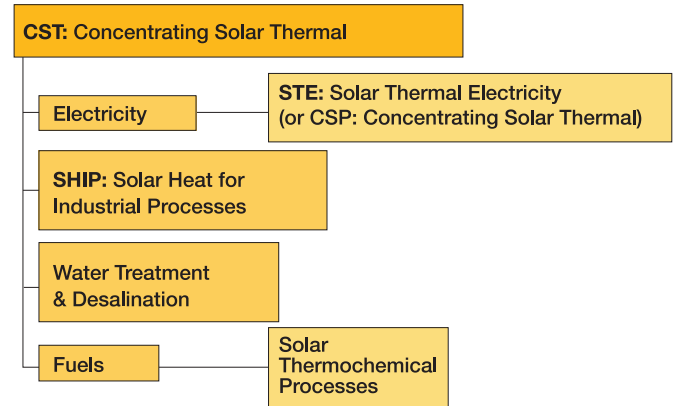
These 4 collector technologies are differentiated based on the geometries of the concentrator and receiver.

		Concentrator Geometry	
		Parabolic	Parabolic Approx.
Receiver Geometry	Point	PD	CR
	Linear	PT	LF

Each collector technology has its own set of advantages and disadvantages, and the “best” technology varies with the application.

Storage Enables Dispatchability: Without Thermal Energy Storage (TES), CST is a “variable” thermal energy source in that the supply of thermal energy varies uncontrollably with solar resources. The addition of TES to a CST system allows the supply of thermal energy to be decoupled from solar resources, resulting in a thermal energy supply that is “dispatchable” and “manageable”. Manageable energy sources are more valuable than variable energy sources, as the energy source can be dispatched when needed. The relatively low cost of TES compared to other energy storage technologies is one of CST’s main competitive advantages.

End-Use: CST is an umbrella term that covers a broad range of end-uses as follows.



Flexible: Flexible power plants can ramp-up and down quickly. Large capacities of flexible power plant capacities are required for grids with large penetrations of variable electric generators such as solar photovoltaic (PV) for grid balancing (i.e. filling the rapidly changing gap between demand and output from variable generators). The value of flexible power plants is demonstrated by the premium price these power plants can charge for their electricity and ancillary services.

Flexible STE with TES and PV are Synergistic Technologies: The European Integrated Sustainable Energy Technology Plan (Integrated SET Plan) envisions an energy transition based on the synergistic integration of diverse energy technologies. This Integrated SET Plan recognizes the synergistic value of dispatchable and flexible STE with TES as a high-value generating technology with PV as a low-cost but variable generating technology

About ODAK2023

ODAK2023 is a new initiative by METU-GÜNAM to create a common national vision for CST in Turkey in 2023 and an associated Strategic Research and Innovation Agenda to reach this vision.

■ **ODAK** means focus in Turkish and derives from the Turkish form of Concentrating Solar Thermal: *Odaklanmış Isıl Güneş Enerjisi*.

■ The year **2023** is significant for two reasons. First, 2023 is the 100th anniversary of the founding of the Turkish Republic and Turkey has established many national goals for this year. Second, 2023 is the approximate end-date of four strongly aligned EU H2020 CST Projects in which METU-GÜNAM is participating.

ODAK2023 GOAL

Innovation-Based and Sustainable
Economic Growth and Energy
Transition Catalyzed by Scientific
Excellence in CST.

Objectives: To strengthen Turkey's Scientific Excellence in CST:

- In harmony with EU initiatives including EU-SOLARIS and the Integrated Strategic Energy Technology Plan (SET-Plan);
- To catalyze innovation-based growth in Turkey's CST Industrial Capacities and Markets;
- To support the transition to a sustainable, secure, affordable and low-carbon energy future.

EU-SOLARIS European Research Infrastructure Consortium (ERIC)



EU-SOLARIS Background: Europe is currently a global leader in CST Research and Innovation (R&I), industrial capacities, and markets. These global leadership positions are strongly coupled to Europe having a large number of valuable and globally unique CST Research Infrastructures (RIs) distributed across research centers in several countries.

EU-SOLARIS Goal: To leverage these existing RIs and strengthen Europe's global leadership positions by creating a pan-European distributed ERIC on CST.

Importance of EU-SOLARIS ERIC to Europe: EU-SOLARIS is one of only 21 projects on the 2016 European Strategy Forum on Research Infrastructures (ESFRI) Roadmap (www.esfri.eu/roadmap-2016). In 2020, EU-SOLARIS will be constituted as a European Research Infrastructure Consortium (ERIC) and become the ESFRI Landmark EU-SOLARIS ERIC.

EU-SOLARIS Central Node: EU-SOLARIS ERIC will be headquartered at CIEMAT-PSA in Spain. CIEMAT-PSA is one of the largest single sited CST RIs globally and is one of METU-GÜNAM's Strategic European CST Partners.

EU-SOLARIS National Nodes: In addition to EU-SOLARIS's Central Node in Spain, EU-SOLARIS ERIC will contain the following national nodes:

Country	National Node
Cyprus	Cyl
France	CNRS
Germany	DLR
Greece	APTL-CERTH
Italy	ENEA
Portugal	LNEG and UEvora
Turkey	METU-GÜNAM

Turkey's EU-SOLARIS ERIC Membership: In late 2019 EU-SOLARIS passed the 1st Stage to become an ERIC and is on-track to become an ERIC in 2020. After becoming an ERIC each member country must commit to paying an annual membership for 4-years.

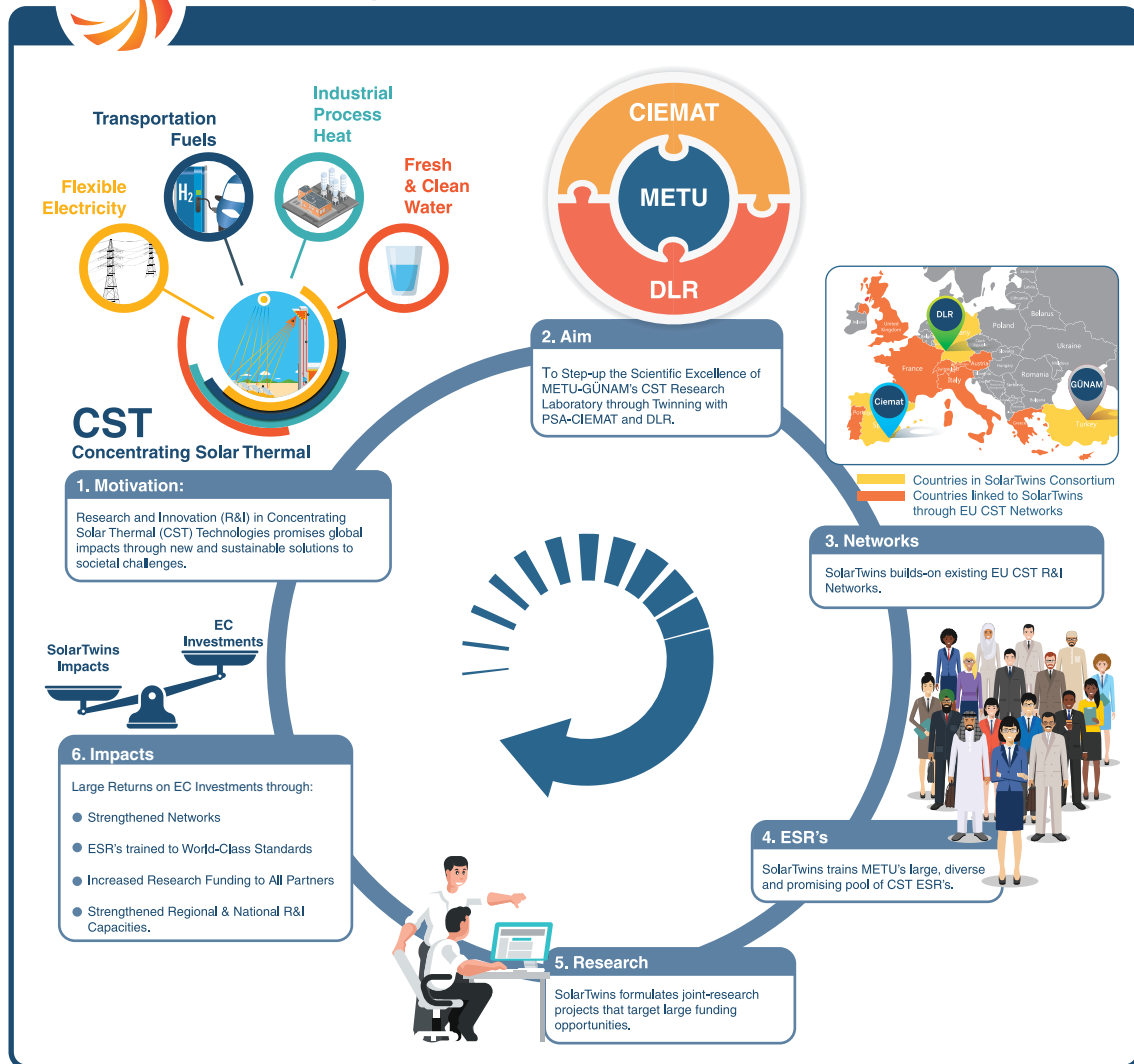
Project Name:	Turkey's EU-SOLARIS ERIC Membership
Dates:	2020-2024 (4-years)
Budget:	120 000 €
PI:	Derek Baker
Grant #:	To be determined

EU-SOLARIS is a First for Turkey!

In the spring 2019 Turkey agreed to join EU-SOLARIS ERIC, which is the first ERIC Turkey has agreed to join. EU-SOLARIS is expected to be legally constituted as an ERIC in the second half of 2020.

EU-SOLARIS's Research Infrastructure at the Central Node PSA-CIEMAT, Spain





About SolarTwins

Goal: To Step-Up the Scientific Excellence and Innovation Capacity of METU-GÜNAM's CST research unit through Twinning with the Leading Institutions CIEMAT-PSA (Spain) and DLR (Germany).

Supports EU-SOLARIS ERIC: CIEMAT-PSA is the EU-SOLARIS ERIC Central Node. DLR and METU-GÜNAM are the EU-SOLARIS ERIC National Nodes for Germany and Turkey.

Joint Doctoral Training: Experts from CIEMAT-PSA and DLR will teach summer schools at METU in 2020 and 2021, and mentor co-advised METU-GÜNAM PhD students.

Joint Research Activities: CIEMAT-PSA and DLR will host METU-GÜNAM researchers for 1-week in 2021 and 2022 for training and networking. These activities are intended to catalyze joint lines of competitively funded research for

■ CIEMAT-PSA and METU-GÜNAM on solar thermal driven water treatment and desalination technologies.

■ DLR and METU-GÜNAM on Next-Generation Central Receiver Technologies.

Targets Large Funding Opportunities: Spain, Germany, and Turkey are expected to be among the largest contributors to a series of future CST Joint Actions (e.g., see aligned H2020 HORIZON-STE Project). One objective of SolarTwins is to create stronger research proposals to these calls that make more effective use of public funds.

SolarTwins is a H2020 Success Story for Turkey!

For the 2018 Horizon 2020 Twinning Call, SolarTwins is

■ Top 8% of proposals at European level, being one of only 37 proposals accepted out of 459 total submissions.

■ Only accepted Twinning proposal from Turkey.
More broadly, SolarTwins is

■ 1st accepted multi-national Horizon 2020 proposal with METU as coordinator;

■ 2nd successful Twinning proposal from Turkey to all EU Horizon 2020 Twinning Calls.

Summary of EU Horizon 2020 Projects

METU-GÜNAM's CST Research Unit is an EU H2020 Success Story within METU!

METU-GÜNAM's five on-going EU H2020 CST projects are

- 1/3 of all on-going METU H2020 projects;
- The largest number of on-going H2020 projects for any research unit at METU;
- Brought in € 937 706 in competitive EU funding to METU.

1. SolarTwins:

Solar Twinning to Create Solar Research Twins



See previous page for details.

Duration:	1 Jan. 2020 – 31 Dec. 2022	Overall Budget:	€ 799 446
Coordinator:	Derek Baker, METU-GÜNAM (Turkey)	METU-GÜNAM Budget:	€ 399 621
Partners:	CIEMAT-PSA (Spain) & DLR (Germany)	Grant No.:	856619
		Project Webpage:	http://solartwins.metu.edu.tr/
		Cordis Webpage:	cordis.europa.eu/project/rcn/224223

2. HORIZON-STE:

Implementation of the Initiative for Global Leadership in Solar Thermal Electricity



Goal: To provide scientific and industrial support to the Implementation of the Initiative for Global Leadership in Solar Thermal Electricity (STE) .

METU-GÜNAM's Primary Contributions: METU-GÜNAM is supporting the Work Package to Maximize the Research and Innovation Impact, is Leading the Task to Evaluate the Implementation of this Initiative, and supporting an analysis of Turkish CST Stakeholders.

Duration:	1 Apr. 2019 – 31 Mar. 2022	Overall Budget:	€ 999 656
Coordinator:	ESTELA (Belgium)	METU-GÜNAM Budget:	€ 64 581
Partners:	DLR (Germany), CIEMAT-PSA (Spain), ENEA (Italy) & METU-GÜNAM (Turkey)	Grant No.:	838514
METU-GÜNAM PI:	Derek Baker	Project Webpage:	www.horizon-ste.eu
		Cordis Webpage:	cordis.europa.eu/project/rcn/221240

3. INSHIP:

Integrating National Research Agendas on Solar Heat for Industrial Processes



Goal: To create a European Common Research and Innovation Agenda (ECRIA) on Solar Heat for Industrial Processes (SHIP).

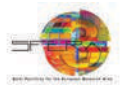
METU-GÜNAM's Primary Contributions: METU is leading Tasks to develop solar thermal technologies for drying and for the metallurgical and cement industries.

Duration:	1 Jan. 2017 – 31 Dec. 2020	Overall Budget:	€ 2.86M
Coordinator:	Fraunhofer-ISE (Germany)	METU-GÜNAM Budget:	€ 195 482
Partners:	28 partners from 10 countries	Grant No.:	731287
METU-GÜNAM PI:	İlker Tarı	Project Webpage:	http://inship.eu/
		Cordis Webpage:	cordis.europa.eu/project/rcn/207022

Summary of EU Horizon 2020 Projects

4. SFERA-III:

Solar Facilities for the European Research Area - Third Phase



Goals: 1) To strengthen scientific collaboration among the leading European CST research institutions; 2) To provide outside researchers access to European CST Research Infrastructures.

METU-GÜNAM's Primary Contributions: METU is contributing to a Task to develop protocols to test prototypes for storage systems. In 2019 through SFERA III METU-GÜNAM provided Romanian researchers access to its High-Flux Solar Simulator.

Duration:	1 Jan. 2019 – 31 Dec. 2022
Coordinator:	CIEMAT-PSA (Spain)
Partners:	15 partners from 8 countries
METU-GÜNAM PI:	Derek Baker

Overall Budget:	€ 9.1M
METU-GÜNAM Budget:	€ 84 688
Grant No.:	823802
Project Webpage:	https://sfera3.sollab.eu
Cordis Webpage:	cordis.europa.eu/project/rcn/219170

5. GeoSmart:

Technologies for geothermal to enhance competitiveness in smart and flexible operation



Goals: To optimize and demonstrate innovations to improve the flexibility and efficiency of geothermal heat and power systems.

METU-GÜNAM's Primary Contributions: To develop and assess novel methods to hybridize geothermal with CST and biomass to increase flexibility.

Duration:	1 Jun. 2019 – 31 May. 2023
Coordinator:	TWI Limited (UK)
Partners:	19 partners from 8 countries, including Zorlu Energy and Kadir Has University from Turkey
METU-GÜNAM PI:	Derek Baker

Overall Budget:	€ 19.7M
METU-GÜNAM Budget:	€ 193 334
Grant No.:	818576
Project Webpage:	https://www.geosmartproject.eu/
Cordis Webpage:	cordis.europa.eu/project/rcn/219170



Summary of Nationally Funded Projects

1. EU-SOLARIS ERIC Membership as part of GÜNAM's Spin-Out Project (Under Negotiation)



See previous page for details. Support for Turkey's membership will tentatively be 20 000 €/year for membership fees and 10 000 €/year for travel and other costs for 4-years.

Duration:	~ 1 Jun. 2020 ~ 31 May. 2024
Coordinator:	CIEMAT-PSA (Spain)
Turkish Scientific Representative	Derek Baker

Turkish Support :	€ 120 00
Grant No.:	To be determined.

2. Development of Solar Drying Technologies for the Valorization of Sludge

Partner: This is a bi-lateral project with The Research and Technology Center of Energy (CRTE) of Tunisia

Goal: Develop a novel solar-driven dryer for olive sludge and determine the value of the dried product as biomass.

Duration:	1 Mar. 2018 – 29 Feb. 2020
METU PI:	İlker Tari

METU Budget:	474 550 TL
Turkish Funding Agency:	TÜBİTAK
Grant No.:	217M062

3. GÜNAM II: Making GÜNAM a Global Centre of Excellence and Integration to Industry



About: This is Research Infrastructure project to strengthen GÜNAM's photovoltaic (PV) and CST capacities. Part of the funds were used to invest in new CST facilities to support national and European (SFERA-III and EU-SOLARIS ERIC) CST activities .

Duration:	2016-2019
METU PI:	Raşit Turan

METU Budget:	~ 5 M€
Funding Agency:	Turkish Ministry of Development
Grant No.:	2015K121200





URL

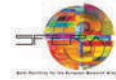


solartwins



@solar_twins

Showcased EU Projects and Activities



Organizing Institutions



Funding Agencies Supporting Showcased Projects



The European Union projects have received funding from the Horizon 2020 research and innovation program under grant agreements No 856619 (SolarTwins), 838514 (HORIZON-STE), 731287 (INSHIP), 823802 (SFERA-III), and 818576 (GeoSmart).



Turkish funding for the bi-lateral project with CRTEn of Tunisia was provided by TÜBİTAK grant 217M062.



Funding for METU-GÜNAM's CST Research Infrastructure for SFERA-III was provided by the Turkish Ministry of Development under grant 2015K121200.