



Università
degli Studi di
Messina

DIPARTIMENTO DI SCIENZE
MATEMATICHE E INFORMATICHE,
SCIENZE FISICHE E SCIENZE DELLA TERRA

VERBALE DEL CONSIGLIO DI DIPARTIMENTO

Adunanza del 6 OTTOBRE 2022

Giorno 6 Ottobre 2022, alle ore 13:45, si riunisce il Consiglio del Dipartimento di Scienze Matematiche e Informatiche, Scienze Fisiche e Scienze della Terra, convocato a norma del Regolamento di Dipartimento presso Aula Magna "Vittorio Ricevuto" (Polo Papardo), per discutere e deliberare sui punti posti in Odg, come di seguito riportati.

Ordine del Giorno

1. Comunicazioni del Direttore;
2. Approvazione verbali sedute del 15 ottobre 2021, del 10 novembre 2021 e del 22 novembre 2021;
3. Ratifica decreti;
4. Autorizzazione stipula, rinnovo, ratifica e/o revoca convenzioni, contratti e accordi;
5. Relazioni annuali attività di ricerca e didattica RTD;
6. Commissione per l'Orientamento e Tutorato di Dipartimento: adempimenti;
7. Offerta formativa a.a. 2022/2023: modifica affidamenti carichi didattici;
8. Richieste nulla osta per attività di studio e di ricerca;
9. Richieste rinnovo assegni di ricerca tipo A;

seduta riservata ai professori di prima e seconda fascia e ai ricercatori

10. Proposte attivazione procedure per la stipula di contratti di ricercatore a tempo determinato;
11. Proposte attivazione procedure reclutamento professori di seconda fascia;
12. Proposte attivazione procedure reclutamento professori di prima fascia;

Ordine del Giorno aggiuntivo

13. Bandi per attività di ricerca, didattica e premialità: borse di studio, premi, prestazioni occasionali e tutor;
14. Proposte bandi per assegni di ricerca di tipo B (a valere su progetti di ricerca)

Di seguito viene riportato l'elenco dei componenti afferenti al Consiglio che hanno preso parte alla seduta. Sono altresì indicati gli assenti, che hanno o non hanno giustificato la loro assenza:

N	COGNOME	NOME	QUALIFICA	PRESENTE	ASSENTE GIUSTIFICATO	ASSENTE
1.	ANELLO	GIOVANNI	ORDINARIO			X
2.	BONANZINGA	MADDALENA	ORDINARIO	X		
3.	CRUPI	MARILENA	ORDINARIO		X	
4.	CRUPI	VINCENZA	ORDINARIO	X		
5.	CUBIOTTI	PAOLO	ORDINARIO	X		

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Cod. Fiscale 80004070837



6.	CURRO'	CARMELA	ORDINARIO	X		
7.	D'ANGELO	GIOVANNA	ORDINARIO	X		
8.	FAZIO	ENZA	ORDINARIO	X		
9.	LO FARO	GIOVANNI	ORDINARIO	X		
10.	MAGAZU'	SALVATORE	ORDINARIO	X		
11.	MAJOLINO	DOMENICO	ORDINARIO	X		
12.	MANGANARO	NATALE	ORDINARIO	X (uscita h. 14:10)		
13.	NERI	FORTUNATO	ORDINARIO	X		
14.	NERI	GIANCARLO	ORDINARIO	X		
15.	NUCCI	MARIA CLARA	ORDINARIO	X		
16.	OLIVERI	FRANCESCO	ORDINARIO			X
17.	ORECCHIO	BARBARA	ORDINARIO	X		
18.	PALUMBO	ANNUNZIATA	ORDINARIO	X		
19.	PATANE'	SALVATORE	ORDINARIO	X		
20.	PRESTI	DEBORA	ORDINARIO	X		
21.	RESTUCCIA	LILIANA	ORDINARIO	X		
22.	SAIJA	ROSALBA	ORDINARIO			X
23.	SAVASTA	SALVATORE	ORDINARIO	X		
24.	TORRISI	LORENZO	ORDINARIO	X		
25.	TRIPODI	ANTOINETTE	ORDINARIO			X
26.	VENUTI	VALENTINA	ORDINARIO	X		
27.	VILLARI	MASSIMO	ORDINARIO	X		
28.	BARBERA	ELVIRA	ASSOCIATO	X		
29.	BRANCA	CATERINA	ASSOCIATO			X
30.	CAMMAROTO	FILIPPO DOMENICO	ASSOCIATO	X		
31.	CONSOLO	GIANCARLO	ASSOCIATO	X (Entrata h 14:03)		
32.	COSTA	DINO	ASSOCIATO	X		
33.	DE SALVO	MARIO	ASSOCIATO			X
34.	DISTEFANO	SALVATORE	ASSOCIATO	X		
35.	FAZIO	RICCARDO	ASSOCIATO			X
36.	FINOCCHIO	GIOVANNI	ASSOCIATO		X	
37.	FIUMARA	GIACOMO	ASSOCIATO	X		
38.	IMBESI	MAURIZIO	ASSOCIATO	X		
39.	JANNELLI	ALESSANDRA	ASSOCIATO	X		
40.	MALESCIO	GIANPIETRO	ASSOCIATO	X		
41.	MANDAGLIO	GIUSEPPE	ASSOCIATO	X		
42.	MANDANICI	ANDREA	ASSOCIATO	X		
43.	MARRA	ANTONELLA CINZIA	ASSOCIATO			X
44.	MEZZASALMA	ANGELA MARIA	ASSOCIATO	X		
45.	PRESTIPINO GIARRITTA	SANTI	ASSOCIATO	X		



46.	RANDAZZO	GIOVANNI	ASSOCIATO			X
47.	RENNA	MARIA ROSARIA	ASSOCIATO		X	
48.	ROGOLINO	PATRIZIA	ASSOCIATO	X		
49.	SERGI	ALESSANDRO	ASSOCIATO		X	
50.	SILIPIGNI	LETTERIA	ASSOCIATO	X		
51.	SOMMA	ROBERTA	ASSOCIATO		X	
52.	SPECIALE	MARIA	ASSOCIATO	X		
53.	TRIFIRO'	ANTONIO	ASSOCIATO		X	
54.	TRIMARCHI	MARINA	ASSOCIATO			X
55.	UTANO	ROSANNA	ASSOCIATO	X		
56.	WANDERLINGH	ULDERICO	ASSOCIATO	X		
57.	ARCADI	GIORGIO	RICERCATORE	X		
58.	CACCAMO	MARIA TERESA	RICERCATORE	X		
59.	CARIDI	FRANCESCO	RICERCATORE	X		
60.	CARNEVALE	LORENZO	RICERCATORE	X		
61.	CASTAGNO	PASQUALE	RICERCATORE	X		
62.	CELESTI	ANTONIO	RICERCATORE	X		
63.	CONTI NIBALI	VALERIA	RICERCATORE	X		
64.	CORSARO	CARMELO	RICERCATORE	X		
65.	DE PASQUALE	MASSIMILIANO	RICERCATORE	X		
66.	DI STEFANO	OMAR	RICERCATORE	X		
67.	FAZIO	MARIA	RICERCATORE	X (entrata h 14:03)		
68.	FEDERICO	MAURO	RICERCATORE	X		
69.	GALLETTA	ANTONINO	RICERCATORE	X		
70.	GORGONE	MATTEO	RICERCATORE	X		
71.	MUNAO'	GIANMARCO	RICERCATORE	X		
72.	MUZIRAFUTI	ANSELME	RICERCATORE	X		
73.	NORDO	GIORGIO	RICERCATORE	X		
74.	PILLONI	ALESSANDRO	RICERCATORE		X	
75.	RINALDO	GIANCARLO	RICERCATORE	X		
76.	STASSI	ROBERTO	RICERCATORE	X		
77.	TOTARO	CRISTINA	RICERCATORE	X (uscita h 14:37)		
78.	TRIPODO	ALESSANDRO	RICERCATORE	X		
79.	VASI	SEBASTIANO	RICERCATORE	X		
80.	VILASI	LUCA	RICERCATORE	X		
81.	ZOCALI	MARIOSIMONE	RICERCATORE		X	
82.	AMANTE	MARIACRISTINA	RAPPR. STUDENTI			X
83.	ANASTASI	ALICE	RAPPR. STUDENTI	X		
84.	AUDITORE	SALVATORE	RAPPR. STUDENTI			X
85.	BOLIGNANI	MATTEO	RAPPR. STUDENTI			X
86.	CALI'	GIORGIA	RAPPR. STUDENTI	X		
87.	CANNISTRACI	DANILO	RAPPR. STUDENTI			X
88.	CURRO'	ROBERTA	RAPPR. STUDENTI			X
89.	DE NOVI	DANNY	RAPPR. STUDENTI			X



90.	FICARRA	FEDERICA	RAPPR. STUDENTI			X
91.	FRENI	GABRIELE	RAPPR. STUDENTI	X		
92.	LEMBO	IGNAZIO DAVIDE GABRIELE	RAPPR. STUDENTI			X
93.	LEO	SIMONE	RAPPR. STUDENTI			X
94.	RICEVUTO	FRANCESCA	RAPPR. STUDENTI			X
95.	RUGGERI	ANDREA	RAPPR. STUDENTI			X
96.	INTERDONATO	MONICA	RAPPR. PTA	X		
97.	NOLI MAIO	MARCO	RAPPR. PTA	X		
98.	BARBERA	GIROLAMO	Segretario Amm.	X		
TOTALE (Presenti - Assenti giustificati - Assenti)				69	8	21

Presiede il Prof. Domenico Majolino, Direttore del Dipartimento. Assume la funzione di segretario verbalizzante il dott. Girolamo Barbera, Segretario Amm.vo.

E' presente, la dott.ssa Silvana Interdonato, Responsabile U. Staff "Segreteria di Direzione", per le attività di supporto amministrativo alla Direzione nello svolgimento dell'odierna seduta.

Il Presidente, constatato il raggiungimento del numero legale, dichiara aperta la seduta e procede alla trattazione dell'Odg.

OMISSIS

Punto 4 OdG - Autorizzazione stipula, rinnovo, ratifica e/o revoca convenzioni, contratti e accordi.

Il Direttore relaziona sulle proposte formulate dalla Prof.ssa Roberta Somma, finalizzate alla stipula dei seguenti accordi:

- Accordo di collaborazione scientifica tra il Dipartimento e "Earth and Environmental Sciences Department, Alicante University" (Spain) per lo svolgimento di "*Studi e ricerche per acquisizione dati su Geology Applied to the search for clandestine graves*". Il Direttore illustra brevemente i contenuti dell'accordo, dettagliati nel testo sottoposto all'attenzione del Consiglio.

- Accordo di collaborazione scientifica tra il Dipartimento e "Departamento de Estratigrafía y Paleontología, Facultad de Ciencias, Universidad de Granada" (Spain) per lo svolgimento di <<*Studi e ricerche per acquisizione dati su "Paleozoic Volcanic - Sedimentary successions of the Calabria-Peloritani Terrane (Southern Italy)" e attività didattica nell'ambito della Geologia*>>. Il Direttore illustra brevemente i contenuti dell'accordo, dettagliati nel testo sottoposto all'attenzione del Consiglio.

Entrambi gli accordi non prevedono oneri finanziari a carico delle parti. In caso di approvazione del Consiglio saranno sottoposti alle valutazioni e determinazioni degli organi accademici, come previsto dalle norme regolamentari di Ateneo.

Esaurita la disamina del punto, il Direttore pone in votazione la proposta di stipula:

a) dell'accordo di collaborazione scientifica tra il Dipartimento e "Earth and Environmental Sciences Department, Alicante University" (Spain) per lo svolgimento di "*Studi e ricerche per acquisizione dati su Geology Applied to the search for clandestine graves*", il cui testo è riportato in allegato pt. 4.a). **Il Consiglio approva all'unanimità.**



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b) dell'accordo di collaborazione scientifica tra il Dipartimento e "Departamento de Estratigrafía y Paleontología, Facultad de Ciencias, Universidad de Granada" (Spain) per lo svolgimento di <<Studi e ricerche per acquisizione dati su "Paleozoic Volcanic – Sedimentary successions of the Calabria-Peloritani Terrane (Southern Italy)" e attività didattica nell'ambito della Geologia>> il cui testo è riportato in allegato pt. 4.b). **Il Consiglio approva all'unanimità.**

OMISSIS

Alle ore 14:55 non essendoci altri punti all'O.d.G., il Direttore dichiara conclusa la seduta, del che il presente verbale letto ed approvato seduta stante per le parti immediatamente deliberative.

**Il Segretario verbalizzante
Dott. Girolamo Barbera**

**Il Direttore
Prof. Domenico Majolino**

Il presente estratto si compone di n° 5 pagine a facciata singola ed è copia conforme all'originale

Il Segretario Amministrativo

Dott. Girolamo Barbera

Firmato digitalmente da

Girolamo Barbera

CN = Girolamo Barbera

C = IT



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UNIVERSIDAD
DE GRANADA

ACCORDO DI COLLABORAZIONE SCIENTIFICA

Studi/ricerche su

**“PALEOZOIC VOLCANIC–SEDIMENTARY SUCCESSIONS OF THE CALABRIA-PELORITANI
TERRANE (SOUTHERN ITALY)”**

E ATTIVITÀ DIDATTICA NELL’AMBITO DELLA GEOLOGIA

Tra

Departamento de Estratigrafía y Paleontología, Facultad de Ciencias, Universidad de Granada (Spain), con sede in Granada, Avenida de la Fuente Nueva S/N C.P. 18071 Granada (Granada), rappresentato dal Direttore pro tempore Prof. D. Ángel Puga Bernabéu, domiciliato per la carica presso la sede istituzionale (di seguito denominato, nel presente atto, DEPARTAMENTO)

E

Dipartimento di Scienze Matematiche e Informatiche, Scienze Fisiche e Scienze della Terra dell’Università degli Studi di Messina, rappresentata dal Direttore pro tempore Prof. Domenico Majolino, domiciliato per la carica presso la sede dipartimentale sita in Viale F. Stagno d’Alcontres n. 31 - 98166 Messina (di seguito denominato, nel presente atto, MIFT).

Nel prosieguo denominate anche le Parti

per

**STUDI E RICERCHE PER ACQUISIZIONE DATI SU “PALEOZOIC VOLCANIC–
SEDIMENTARY SUCCESSIONS OF THE CALABRIA-PELORITANI TERRANE
(SOUTHERN ITALY)” E ATTIVITÀ DIDATTICA NELL’AMBITO DELLA GEOLOGIA**

PREMESSE

RITENUTO che il DEPARTAMENTO e il MIFT hanno un reciproco interesse ad addivenire ad una collaborazione istituzionale finalizzata al raggiungimento di obiettivi comuni nell’ambito di studi geologici su “Paleozoic volcanic–sedimentary successions of the Calabria-Peloritani Terrane (southern Italy)”, avviando uno specifico programma di studio e di ricerca sulla litostratigrafia, biostratigrafia e geocronologia delle successioni paleozoiche della catena alpina peri-mediterranea dell’Arco Calabro-Peloritano.

CONSIDERATO che il DEPARTAMENTO e il MIFT sono da tempo impegnati in attività di ricerca nell’ambito su specificato.

CONSIDERATO che il DEPARTAMENTO intende avvalersi delle attrezzature e delle strutture di ricerca dei laboratori di cui è responsabile la Prof.ssa Roberta Somma del MIFT.

CONSIDERATO che il MIFT intende avvalersi delle attrezzature e delle strutture di ricerca dei laboratori di cui è responsabile il Prof. Agustin Martin-Algarra.

CONSIDERATO che è interesse comune del DEPARTAMENTO e del MIFT, attivare opportunità e iniziative di collaborazione finalizzate ad un reciproco arricchimento, mediante un partenariato di attività di studio e ricerca.

CONSIDERATO che vengono correntemente stipulati accordi di collaborazione fra enti pubblici per lo svolgimento di attività di interesse comune, anche per quanto riguarda attività di studio e ricerca.

CONSIDERATO che il presente accordo di collaborazione non realizza, in ogni caso, alcuna forma associativa tra le parti, né comporta obblighi reciproci di natura economica o patrimoniale.

SI CONVIENE E SI STIPULA QUANTO SEGUE

Articolo 1

Validità delle Premesse

Le premesse costituiscono parte integrante del presente atto.

Articolo 2

Oggetto e finalità dell'accordo

Il presente accordo persegue l'intento di instaurare un rapporto di collaborazione nel quale le attività di studio e di ricerca scientifica e didattiche delle Parti possano integrarsi e coordinarsi reciprocamente. In particolare, le stesse si impegnano a promuovere, sviluppare e consolidare iniziative di collaborazione, volte all'attuazione dei rispettivi obiettivi scientifici, tecnologici e di ricerca, e di studio nell'ambito delle "Paleozoic volcanic-sedimentary successions of the Calabria-Peloritani Terrane (southern Italy)".

Articolo 3

Impegni di reciprocità e modalità di esecuzione delle attività

1. Le Parti si impegnano a:
 - a) mettere a disposizione le proprie competenze e professionalità e i propri laboratori e mezzi per l'espletamento delle ricerche e studi, per lo svolgimento delle attività di interesse comune;
 - b) mettere a disposizione la documentazione esistente relativa alle aree interessate dallo studio;
 - c) operare in sinergia per l'esecuzione delle attività di ricerca secondo quanto riportato nel programma delle attività al presente accordo (Allegato 1);
 - d) programmare e organizzare incontri/seminari presso i propri locali per consentire la discussione e gli approfondimenti sulla materia.
2. Le attività dell'accordo potranno formare oggetto di tesi di laurea e tirocini formativi di cui le Parti si impegnano a darsi reciprocamente tempestiva notizia.
3. Per il conseguimento dei fini prefissati del presente accordo, le Parti consentono l'accesso alle rispettive strutture e quant'altro fosse ritenuto utile per il raggiungimento dei fini del presente Accordo, sempre compatibilmente con i rispettivi limiti imposti da risorse, finalità, oneri ed obblighi istituzionali.
4. Le Parti si impegnano a condurre le attività afferenti ai progetti di ricerca comuni nel rispetto delle leggi vigenti in materia di sicurezza dei luoghi di lavoro e di tutela della salute dei lavoratori.
5. Ciascuna Parte si farà carico di eventuali oneri o spese per lo svolgimento di attività di rispettiva competenza, ritenute necessarie dai Referenti scientifici per dare esecuzione al presente Accordo. Nello specifico, ogni eventuale spesa dovrà gravare sui rispettivi fondi di pertinenza dei Referenti scientifici o dei gruppi di ricerca coinvolti.

Articolo 4

Referenti scientifici

1. I referenti scientifici, responsabili degli studi e delle ricerche scientifiche (Principal Investigator) designati dalle Parti per la gestione delle attività oggetto del presente Accordo, sono:
 - per il DEPARTEMENTO Prof. Agustin Martin-Algarra;
 - per il MIFT Prof.ssa Roberta Somma.
2. Ciascuna Parte si riserva il diritto di sostituire il Referente sopra individuato, dandone tempestiva comunicazione alla controparte, secondo le modalità previste dall'art.5, comma 5 del presente accordo.

Articolo 5

Durata, modifiche, rinnovo e facoltà di recesso

1. Il presente accordo avrà la durata di anni due (2), rinnovabile e/o prorogabile per un uguale periodo, previo accordo scritto tra le Parti ed a seguito di autorizzazione dei rispettivi organi deliberativi.
2. Le parti concordano di portare a compimento, ove ritenuto possibile e utile, le attività in corso di svolgimento al momento della scadenza del presente accordo.
3. Il presente Accordo potrà altresì essere soggetto a modifiche previa verifica dei risultati, da concordare in specifico atto integrativo che le Parti potranno stipulare, previa autorizzazione dei rispettivi organi deliberativi.
4. Le Parti potranno recedere dal presente Accordo, mediante comunicazione scritta, da inviarsi nel rispetto di un preavviso di mesi due (2).
5. Qualsiasi comunicazione, notifica, richiesta relativa al presente Accordo sarà eseguita per iscritto e inviata con qualsiasi mezzo atto a comprovarne l'avvenuta ricezione agli indirizzi di seguito indicati:
 - per il DEPARTAMENTO:
Avenida de la Fuente Nueva S/N C.P. 18071 Granada (Granada)
e-mail socorro@ugr.es;
 - per il MIFT:
Viale F. Stagno d'Alcontres, 31, 98166 Messina
e-mail dipartimento.mift@unime.it
pec dipartimento.mift@pec.unime.it.

Articolo 6

Programma delle attività di studio e ricerche

Il programma sintetico di studi e ricerche, come previsto nell'annesso "Allegato 1", prevede le seguenti attività:

- a. Ricerca bibliografica della letteratura esistente.
- b. Ricerca nell'Arco Calabro-Peloritano di affioramenti di successioni carbonatiche paleozoiche da sottoporre ad analisi lito- e biostratigrafiche.
- c. Campionatura di carbonati paleozoici nell'Arco Calabro-Peloritano da sottoporre ad analisi biostratigrafiche.
- d. Estrazione associazioni a conodonti dalle rocce carbonatiche presso il laboratorio di Geologia del Dip. MIFT.
- e. Classificazione e datazione dei conodonti presso il laboratorio del DEPARTAMENTO.
- f. Ricerca nell'Arco Calabro-Peloritano di affioramenti di vulcaniti acide e basiche paleozoiche da sottoporre a campionatura per analisi geocronologiche.
- g. Estrazione zirconi ai fini radiometrici presso il laboratorio di Geologia del Dip. MIFT.
- h. Datazione degli zirconi presso i laboratori del DEPARTAMENTO.
- i. Elaborazioni dati lito-, bio-stratigrafici e geocronologici risultanti dalle attività di cui al presente Accordo.
- j. Elaborazione pubblicazioni scientifiche con i risultati della ricerca.

Articolo 7

Utilizzo del logo

Le Parti si danno atto dell'esigenza di tutelare e promuovere l'immagine dell'iniziativa comune e quella di ciascuna di esse. In particolare i loghi del DEPARTAMENTO e del MIFT potranno essere utilizzati nell'ambito delle attività comuni oggetto del presente accordo, in conformità alle rispettive disposizioni normative e regolamenti vigenti.

Articolo 8

Attività in collaborazione e proprietà intellettuale dei risultati

1. Tutti i risultati totali o parziali derivanti dall'esecuzione di progetti comuni di ricerca sono di proprietà comune delle Parti.
2. Parti si impegnano reciprocamente a dare atto, in occasione di presentazioni pubbliche dei risultati conseguiti o in caso di redazione e pubblicazione di documenti di qualsiasi tipo, che quanto realizzato consegue alla collaborazione instaurata con il presente Accordo.

Articolo 9

Trattamento dei dati personali

Il trattamento di dati personali relativi al presente Accordo è effettuato dalle Parti in qualità di Titolari, secondo quanto previsto dall'art. 4 del Regolamento (UE) 2016/679 del Parlamento Europeo e del Consiglio del 27 aprile 2016 (cd. "Regolamento") e dal decreto legislativo 30 giugno 2003, n. 196, come modificato dal decreto legislativo 10 agosto 2018, n. 101 (cd. "Codice") e avverrà nel rispetto dei principi di liceità, necessità, correttezza, pertinenza e non eccedenza, esclusivamente per le finalità del presente atto e nel rispetto di quanto previsto dalla normativa vigente in materia di protezione dei dati personali di cui al Regolamento e al Codice citati.

Articolo 10

Riservatezza

Ciascuna Parte si impegna a non divulgare le informazioni di cui sia venuta a conoscenza o trasmesse nell'ambito dell'esecuzione del presente Accordo, ed a trattarle con la massima riservatezza. I dipendenti e/o collaboratori dovranno tutelare con la dovuta riservatezza e cautela tutte le informazioni di cui verranno a conoscenza in occasione dell'esecuzione del presente Accordo. Il suddetto obbligo di riservatezza dovrà essere rispettato e fatto rispettare anche successivamente alla scadenza del presente Accordo.

Articolo 11

Copertura assicurativa, Salute e sicurezza nei luoghi di lavoro

1. Ciascuna Parte assume tutti gli obblighi e oneri, anche assicurativi, antinfortunistici, assistenziali e previdenziali nei confronti del proprio personale, studenti compresi, impegnato nelle attività sviluppate in attuazione del presente Accordo.
2. Le Parti, si impegnano a rispettare le disposizioni normative e regolamenti in materia di sicurezza dei luoghi di lavoro e di tutela della salute dei lavoratori.
3. Il personale e i collaboratori del DEPARTMENTO e del MIFT, autorizzati a recarsi presso ciascuna Parte per lo svolgimento delle attività relative al presente Accordo, sono tenuti ad uniformarsi alle disposizioni normative, regolamenti o disciplinari ed alle disposizioni in materia di sicurezza vigenti nelle sedi ospitanti.

Articolo 12

Controversie

In caso di controversie in ordine all'applicazione del presente Accordo, le Parti si impegnano alla composizione amichevole delle stesse. In caso contrario, le eventuali controversie saranno devolute all'autorità giudiziaria competente.

Articolo 13

Oneri fiscali

1. Le parti convengono che il presente accordo è soggetto a registrazione solo in caso d'uso, ai sensi della normativa vigente. Le eventuali spese di registrazione saranno a carico della parte richiedente.
2. Il presente atto, redatto in un unico originale e sottoscritto in formato digitale, è soggetto ad imposta di bollo assolta virtualmente dall'Università degli Studi di Messina, giusta autorizzazione dell'Agenzia delle Entrate di Messina n. 67760 del 2010.

Articolo 14

Validità dell'accordo

Il presente accordo di collaborazione è sottoscritto con firma digitale ed avrà decorrenza a far data dall'ultima sottoscrizione.

Per l'Università di Granada
Departemento de Estratigrafia y Paleontologia

Il Direttore
Prof. Ángel Puga Bernabéu

Per il Dipartimento di Scienze Matematiche e
Informatiche Scienze Fisiche e Scienze della Terra
Università degli Studi di Messina

Il Direttore
Prof. Domenico Majolino

Paleozoic volcanic–sedimentary successions of the Calabria-Peloritani

Terrane (southern Italy): consequences for the geodynamic evolution the western Paleotethys

Keywords: Conodonts, Limestones, Volcanites, Calabria-Peloritani Southern Subterrane, early Silurian, Devonian, Carboniferous, Palaeozoic, Paleotethys, Protothetys, Northern Gondwana margin

Paleozoic successions of the Western Mediterranean Alpine belts make part, essentially, of their Internal Domains, which were affected by strong deformation and metamorphism related to preAlpine and Alpine orogenic evolution. In the last years, important advance has been achieved in recent times either on their stratigraphy and their Variscan orogenic and tectonometamorphic evolution (Martín-Algarra et al., 2009 a and b; Navas Parejo et al., 2009a and b; Cirrincione; Rosetti et al., 2010; Sánchez-Navas et al., 2012, 2014). Most new stratigraphic data on these domains, from the Gibraltar Arc (especially from the Malaguide Complex) to the Calabria-Peloritani Arc (NavasParejo et al., Rodríguez-Cañero et al., 2010; Rodríguez-Cañero and Martín-Algarra, 2014), confirm classic ideas on the close relationships among their Paleozoic successions of and those of the Alps (e.g., Fallot, 1948, 1953; Amodio-Morelli et al., 1976), especially with the Austroalpine and South Alpine terrains (Carnic Alps in particular), rather than with the European Variscan terrains. In this sense, these terrains would make part of the Intra-Alpine Paleozoic Terrane (in the sense of Stampfli, 1996)

These successions occupy an intermediate position between the better known successions of the Alps and of the European and North Africa Variscan massifs but the details of their stratigraphy and tectonic structure are usually ignored in most models on the paleogeographic and geodynamic Paleozoic evolution of these regions. Nevertheless, the Paleozoic terrains of the Western Mediterranean Alpine Belts are located in a key position within the regional and should be considered in depth to clarify the geologic evolution of a wide region where, during the early to mid-Paleozoic, several ribbon continents and microplates detached from North Godwana (microplates) and several oceanic basins opened to be finally closed during Pangea amalgamation at the end of the Variscan Orogeny.

Actually, the analysis of their stratigraphic record and pre-Alpine tectonic structure may help to reconstruct the palaeogeography and geodynamics of the three Paleozoic oceans successively opened and closed to the North of Gondwana: Prototethys, Rheic and Paleotethys (Stampfli, 2000).

In the European Variscan massifs and in the Alps the oldest ocean, the Prototethys, opened during the Late Precambrian and was subducted since the latest Proterozoic up to the Ordovician-Silurian transition (Stampfli, 2000; Von Raumer et al., 2002; Stampfli and Borel, 2002; Berra and Angiolini, 2014). The Rheic Ocean opened in Ordovician-Silurian time and was completely subducted during the Devonian-earliest Carboniferous (Martínez-Catalán et al., 1997; Murphy et al., 2006, 2009, 2010; Linnemann et al., 2008; Arenas et al., 2007, 2009, 2015; Sánchez-Martínez et al., 2007, 2009; Díez-Fernández et al., 2010; Nance et al., 2010, among many others). The youngest Paleozoic ocean, the Paleotethys, opened during the Silurian-Devonian time-span and was subducted, preferentially, from the Early Carboniferous up to the end of the Triassic (Şengör, 1979, 1987, 1990; Şengör et al., 1980; Şengör and Yilmaz, 1981; Stampfli, 2000; Stampfli et al., 2002, 2003; Natal'in and Şengör, 2005; Robertson and Ustömer, 2009, among many others).

It is unclear, however, if the Paleotethys was the eastward continuation of the Rheic Ocean or if it constituted an independent ocean. According to models mainly based on plate tectonics reconstructions, the Paleotethys was located between the Gondwana, to the south, and the so-called European Hunic composite superterrane, to the north (von Raumer, 1998; Stampfli, 2000; Tait et al., 2000; Stampfli and Borel, 2002, 2004; Stampfli et al., 2002, 2003; von Raumer et al., 2002, 2003, 2009). This superterrane, later named Galatian Terrane (Von Raumer and Stampfli, 2008), was interpreted as a ribbon continent completely detached and drifted away from the Northern Gondwana margin, from Asia to South America, as a consequence of the Paleotethys opening.

According to other hypotheses mainly based on field studies, the ophiolite-bearing sutures found the

Variscan massifs of Spain and Morocco, cannot be ascribed to the Paleotethys, but to: *i*) the Rheic Ocean (Simancas et al., 2005, 2006; Arenas et al., 2007, 2009; Martínez-Catalán et al., 2009; Murphy et al., 2009, 2010; Keppie et al., 2010; Michard et al., 2010; Nance et al., 2010; Ribeiro et al., 2010; Braid et al., 2011), *ii*) smaller oceans like embayments related to the Rheic opening (*e.g.*, the South-Armorican Ocean concept of Paris and Robardet, 1990), *iii*) back-arc basins (Azor et al., 2008; Von Raumer et al., 2008; Simancas et al., 2009), or, finally, *iv*) older (Proterozoic) oceans (Murphy et al., 2006; El Hadi et al., 2010). Analogously, the Palaeozoic ophiolitic remnants of the proper Alps (Loth et al., 2001; Schaltegger et al., 2003) are not considered as belonging to the Paleotethys but as related to smaller oceans (Chamrouse ocean, Von Raumer and Stampfli, 2008). In this research programme we discuss the key position of one segment of the WMIAPTs, for defining the real extent of the Paleotethys Ocean and its margins in the North Gondwanic regions. Actually, they should preserve some evidence of the westward prolongation of the Paleotethys, or of its termination. Consequently, the study and correlation of the Palaeozoic volcano-sedimentary record of the WMIAPTs acquire a paramount importance. Particularly, the Calabria-Peloritani Southern Subterrane of Southern Italy here studied, is one of the southernmost WMIAPTs where updated detailed stratigraphic studies have recently been provided for two different Palaeozoic volcano-

sedimentary successions, those of the Stilo Unit (southern Calabria: Navas-Parejo et al., 2009a, b) and of the Longi-Taormina Unit (Peloritani Mts.:Rodríguez-Cañero et al., 2013; Somma et al., 2013). These two different successions are composed of slightly metamorphosed CambrianOrdovician? siliciclastic rocks hosting calc-alkaline volcanic rocks (Upper Ordovician in age in the Longi-Taormina Unit, Trombetta et al., 2004) and undated alkaline volcanics, capped by upper Silurian-Devonian metacarbonates. Both successions end with Carboniferous black cherts (lydites) and Culm-like siliciclastic facies (Navas-Parejo et al., 2009a, b; Rodríguez-Cañero et al., 2013; Somma et al., 2013). We focus our attention on the Stilo and Longi-Taormina Units, as they show the less metamorphosed and best-preserved Palaeozoic volcano-sedimentary successions of the Southern Subterranean of the Calabria-Peloritani Terrane.

Particularly:

i) we'll attempt to better define the geochronological age of the Longi-Taormina Unit alkaline and calc-alkaline suites by using Sensitive High Resolution Ion Microprobe (SHRIMP) analysis of zircon;

ii) we'll propose a stratigraphic synthesis of the Stilo Unit and Longi-Taormina Unit based on recent stratigraphic data (Navas-Parejo et al., 2009a, 2009b; Rodríguez-Cañero et al., 2013; Somma et al., 2013b) integrated by geochronological dating;

iii) we'll propose a correlation between these two Palaeozoic successions and other better known WMIAPTs successions in the Alps (Schönlaub, 1992, 1997, 1998, 2000; von Raumer and Neubauer, 1993; Neubauer et al., 1994; Schönlaub and Heinisch, 1994; von Raumer, 1998; Schönlaub and Histon, 1999, 2000; Neubauer and Handler 2000; Neubauer, 2002, among many others) and in the Betic Cordillera (Herbig, 1983, 1984; Rodríguez-Cañero, 1993; Martín-Algarra et al., 2004); Menorca: Bourrouilh, 1983), as well as in the Variscan terranes of Sardinia (Carmignani et al., 1994; Giacomini et al., 2006; Oggiano et al., 2010) and in the Variscan Massifs now outcropping in the European and African Alpine-Mediterranean foreland (Michard, 1976; Piqué, 1994; Dercourt, 2000; Gibbons and Moreno, 2002; Vera, 2004; Hoepffner et al., 2005, or Murphy et al., 2009, among many others); iv) and, finally, we'll propose a reconstruction of the environmental, palaeogeographic, and geodynamic evolution undergone by the Stilo Unit and Longi-Taormina Unit Palaeozoic volcanosedimentary successions, and will give new insights on the paleogeography of the Calabria-

Peloritani Southern Subterranean in the frame of Gondwanaland. This latter topic has been addressed taking into account the progress in the study of other WMIAPTs and Variscan massifs, where the Palaeozoic palaeogeography and geodynamics are currently better known (Paris and Robardet, 1990; Schönlaub, 1992, 1997, 1998, 2000; von Raumer, 1998; Neubauer and Handler, 1999; Schönlaub and Histon, 1999 and 2000, Stampfli, 2000; Stampfli and Borel, 2002, 2004; Stampfli et al., 2002; Gutiérrez-Alonso et al., 2003, 2008; Robardet, 2003; von Raumer et al., 2002, 2003, 2009; Martín-Algarra et al., 2004, 2009a, 2009b; Torsvik and Cocks, 2004; Cocks and Torsvik,

2006; Simancas et al., 2005, 2006, 2009; Von Raumer and Stampfli, 2008; Ballèvre et al., 2009; Martínez-Catalán et al., 2009; Michard et al., 2010; Rodríguez-Cañero et al., 2010; Sarmiento et al., 2011, and references therein).

Il programma prevede le seguenti attività e analisi:

- a. Ricerca bibliografica della letteratura esistente.
- b. Ricerca nell'Arco Calabro-Peloritano di affioramenti di successioni carbonatiche paleozoiche da sottoporre ad analisi lito- e biostratigrafiche.
- c. Campionatura di carbonati paleozoici nell'Arco Calabro-Peloritano da sottoporre ad analisi biostratigrafiche.
- d. Estrazione associazioni a conodonti dalle rocce carbonatiche presso il laboratorio di Geologia del Dip. MIFT.
- e. Classificazione e datazione dei conodonti presso il laboratorio del DEPARTAMENTO.
- f. Ricerca nell'Arco Calabro-Peloritano di affioramenti di vulcaniti acide e basiche paleozoiche da sottoporre a campionatura per analisi geocronologiche.
- g. Estrazione zirconi ai fini radiometrici presso il laboratorio di Geologia del Dip. MIFT.
- h. Zircon U-Pb geochronology by SHRIMP presso i laboratori del DEPARTAMENTO.
- i. Elaborazioni dati lito-, bio-stratigrafici e geocronologici risultanti dalle attività di cui al presente Accordo.
- j. Pubblicazioni scientifiche con i risultati della ricerca.

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AGREEMENT OF SCIENTIFIC COLLABORATION

Studies / research on

**“PALEOZOIC VOLCANIC–SEDIMENTARY SUCCESSIONS OF THE CALABRIA-PELORITANI
TERRANE (SOUTHERN ITALY)”
AND TEACHING ACTIVITIES IN THE FIELD OF GEOLOGY**

between

DEPARTAMENTO *de Estratigrafía y Paleontología, Facultad de Ciencias*, University of Granada (Spain), based in Granada, *Avenida de la Fuente Nueva S/N C.P. 18071 Granada* (Granada), represented by Head of Department, Prof. D. Ángel Puga Bernabéu, domiciled for the office at the institutional headquarters (hereinafter referred to in this deed, DEPARTMENT)

and

Dipartimento di Scienze Matematiche e Informatiche, Scienze Fisiche e Scienze della Terra, University of Messina, represented by Head of Department, Prof. Domenico Majolino, domiciled for the office at the institutional headquarters in Viale F. Stagno d’Alcontres n. 31 - 98166 Messina (hereinafter referred to in this deed, MIFT).

Hereinafter also referred to as the Parties

for

**STUDIES AND RESEARCH FOR DATA ACQUISITION ON “PALEOZOIC VOLCANIC–
SEDIMENTARY SUCCESSIONS OF THE CALABRIA-PELORITANI TERRANE
(SOUTHERN ITALY)” AND TEACHING ACTIVITIES IN THE FIELD OF GEOLOGY**

PREMISES

CONSIDERING that the DEPARTMENT and the MIFT have a mutual interest in reaching an institutional collaboration for achieving common purposes in the context of geological studies on “Paleozoic volcanic–sedimentary successions of the Calabria-Peloritani Terrane (southern Italy)”, starting a specific study and research program on lithostratigraphy, biostratigraphy, and geochronology of the Paleozoic successions of the peri-Mediterranean Alpine chain of the Calabria-Peloritani arc.

CONSIDERING that the DEPARTMENT and the MIFT have been still engaged in research activities in the aforementioned area.

CONSIDERING that the DEPARTMENT intends to make use of the equipment and research facilities of the laboratories for which the Prof. Roberta Somma of the MIFT is responsible.

CONSIDERING that the MIFT intends to make use of the equipment and research facilities of the laboratories for which the Prof. Agustin Martin-Algarra is responsible.

CONSIDERING that it is in the common interest of the DEPARTMENT and the MIFT, activate opportunities and collaborative initiatives aimed at mutual enrichment, through a partnership of study and research activities.

CONSIDERING that collaboration agreements are currently stipulated between public bodies for the performance of activities of common interest, also as regards study and research activities.

CONSIDERING that this collaboration agreement does not implement, in any case, any form of association between the parties, and does not entail mutual obligations of an economic or patrimonial nature.

IT IS AGREED AND IS STIPULATED THE FOLLOWING

Article 1 Validity of the Premises

The premises are an integral part of this deed.

Article 2

Object and purpose of the agreement

This agreement pursues the aim of establishing a relationship of collaboration in which activities of study and scientific and didactic research of the Parties may integrate and coordinate each other. In particular, they undertake to promote, develop, and consolidate collaborative initiatives, aimed at the implementation of the respective scientific, technological, and research objectives, and of study in the field of "Paleozoic volcanic-sedimentary successions of the Calabria-Peloritani Terrane (southern Italy)".

Article 3 *Reciprocal commitments and methods of carrying out activities*

1. The Parties undertake to:

- a) make available their skills, professionalism, laboratories, and facilities for carrying out research and studies, for realizing activities of common interest;
- b) make available the existing documentation relating to the areas affected by the study;
- c) work in synergy for the execution of research activities as reported in the program of activities of this agreement (Annex 1);
- d) plan and organize meetings / seminars at their offices to allow discussion and insights on the subject.

2. The activities of the agreement may be the subject of degree theses and training internships of which the Parties undertake to give each other timely notice.

3. To achieve the purposes set out in this agreement, the Parties allow access to their respective structures and anything else deemed useful for achieving the purposes of this Agreement, always compatibly with the respective limits imposed by resources, purposes, charges, and institutional obligations.

4. The Parties undertake to conduct the activities relating to joint research projects in compliance with the laws in force on workplace safety and the protection of workers' health.

5. Each Party will be responsible for any charges or expenses for carrying out activities of its respective competence, deemed necessary by the Scientific Referents to implement this Agreement. Specifically, any expenditure must be borne by the respective funds pertaining to the scientific representatives or research groups involved.

Article 4 Scientific contacts

1. The scientific representatives, responsible for scientific studies and research (Principal Investigator) designated by the Parties for the management of the activities covered by this Agreement, are:

- For the DEPARTMENT Prof. Agustin Martin-Algarra;
- For the MIFT Prof. Roberta Somma.

2. Each Party reserves the right to replace the Contact Person identified above, promptly notifying the counterparty, in accordance with the procedures set out in Article 5, paragraph 5 of this agreement.

Article 5

Duration, changes, renewal and right of withdrawal

1. This agreement will cover a time span of two (2) years, renewable and extendable for an equal period, subject to written agreement between the Parties and following the authorization of the respective decision-making bodies.
2. The parties agree to carry out, where deemed possible and useful, the activities in progress at the time of the expiry of this agreement.
3. This Agreement may also be changed and subject to verification of the results, to be agreed in a specific supplementary deed that the Parties may stipulate, subject to the authorization of their respective decision-making bodies.
4. The Parties may withdraw from this Agreement, by written notice, to be sent in compliance with two (2) months' notice.
5. Any communication, notification, request relating to this Agreement will be made in writing and sent by means of any means capable of proving its receipt at the addresses indicated below:
 - For the DEPARTMENT:
Avenida de la Fuente Nueva S/N C.P. 18071 Granada (Granada)
e-mail socorro@ugr.es;
 - For the MIFT:
Viale F. Stagno d'Alcontres, 31, 98166 Messina
e-mail dipartimento.mift@unime.it
pec dipartimento.mift@pec.unime.it.

Article 6

Program of study and research activities

The synthetic program of the studies and researches, as provided in the annex "Annex 1", includes the following activities:

- a. Bibliographic research of existing literature.
- b. Search of outcrops of Paleozoic carbonate successions for litho- and biostratigraphic analyses in the Calabria-Peloritani Arc.
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- g. Extraction of zircons for radiometric purposes at the Geology laboratory of the MIFT Department.
- h. Dating of the zircons in the laboratories of the DEPARTMENT.
- i. Litho-, bio-stratigraphic, and geochronological data processing resulting from the activities referred to in this Agreement.
- j. Preparation of scientific articles with the results of the research.

Article 7

Use of the logo

The Parties acknowledge the need to protect and promote the image of the joint initiative and that of each of them. In particular, the logos of the DEPARTMENT and the MIFT may be used as part of the

common activities covered by this agreement, in accordance with the respective laws and regulations in force.

Article 8

Collaborative activities and intellectual property of the results

1. All total or partial results deriving from the execution of joint research projects are the common property of the Parties.
2. Parties mutually undertake to acknowledge, on the occasion of public presentations of the results achieved or in the event of the drafting and publication of documents of any kind, that what has been achieved results from the collaboration established with this Agreement.

Article 9

Treatment of personal data

The processing of personal data relating to this Agreement is carried out by the Parties as Holders, in accordance with the provisions of art. 4 of the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 (so-called "Regulation") and by the legislative decree of 30 June 2003, n. 196, as amended by Legislative Decree 10 August 2018, n. 101 (so-called "Code") and will take place in compliance with the principles of lawfulness, necessity, correctness, relevance and not excess, exclusively for the purposes of this deed and in compliance with the provisions of current legislation on the protection of personal data of referred to in the aforementioned Regulation and Code.

Article 10

Confidentiality

Each Party undertakes to not disclose the information it has become aware of or transmitted as part of the execution of this Agreement, and to treat it with the utmost confidentiality. Employees and collaborators must protect with due confidentiality and caution all information they become aware of during the execution of this Agreement. The aforementioned confidentiality obligation must be respected and enforced even after the expiry of this Agreement.

Article 11

Insurance coverage, health, and safety in the workplace

1. Each Party assumes all obligations and obligations, including insurance, accident prevention, welfare, and social security obligations towards its staff, including students, engaged in the activities developed in implementation of this Agreement.
2. The Parties undertake to comply with the laws and regulations regarding workplace safety and the protection of workers' health.
3. The staff and collaborators of the DEPARTMENT and MIFT, authorized to go to each Party to carry out the activities relating to this Agreement, are required to comply with the laws, regulations or disciplinary provisions and the safety provisions in force in the host offices.

Article 12

Disputes

In the event of disputes regarding the application of this Agreement, the Parties undertake to settle them amicably. Otherwise, any disputes will be devolved to the competent judicial authority.

Article 13

Tax charges

1. The parties agree that this agreement is subject to registration only in case of use, in accordance with current legislation. Any registration fees will be borne by the requesting party.
2. This deed, drawn up in a single original and signed in digital format, is subject to stamp duty paid virtually by the University of Messina, with proper authorization of the Messina Inland Revenue n. 67760 of 2010.

Article 14
Validity of the agreement

This collaboration agreement is signed with a digital signature and will take effect from the last signing.

For the *Departemento de Estratigrafia y Paleontologia*
University of Granada

Head of Department
Prof. Ángel Puga Bernabéu

For the *Dipartimento di Scienze Matematiche e
Informatiche Scienze Fisiche e Scienze della Terra*
(MIFT)

University of Messina
Head of Department
Prof. Domenico Majolino

Paleozoic volcanic–sedimentary successions of the Calabria-Peloritani**Terrane (southern Italy): consequences for the geodynamic evolution the western Paleotethys**

Keywords: Conodonts, Limestones, Volcanites, Calabria-Peloritani Southern Subterrane, early Silurian, Devonian, Carboniferous, Palaeozoic, Paleotethys, Protothetys, Northern Gondwana margin

Paleozoic successions of the Western Mediterranean Alpine belts make part, essentially, of their Internal Domains, which were affected by strong deformation and metamorphism related to preAlpine and Alpine orogenic evolution. In the last years, important advance has been achieved in recent times either on their stratigraphy and their Variscan orogenic and tectonometamorphic evolution (Martín-Algarra et al., 2009 a and b; Navas Parejo et al., 2009a and b; Cirrincione; Rosetti et al., 2010; Sánchez-Navas et al., 2012, 2014). Most new stratigraphic data on these domains, from the Gibraltar Arc (especially from the Malaguide Complex) to the Calabria-Peloritani Arc (NavasParejo et al., Rodríguez-Cañero et al., 2010; Rodríguez-Cañero and Martín-Algarra, 2014), confirm classic ideas on the close relationships among their Paleozoic successions of and those of the Alps (e.g., Fallot, 1948, 1953; Amodio-Morelli et al., 1976), especially with the Austroalpine and South Alpine terrains (Carnic Alps in particular), rather than with the European Variscan terrains. In this sense, these terrains would make part of the Intra-Alpine Paleozoic Terrane (in the sense of Stampfli, 1996)

These successions occupy an intermediate position between the better-known successions of the Alps and of the European and North Africa Variscan massifs but the details of their stratigraphy and tectonic structure are usually ignored in most models on the paleogeographic and geodynamic Paleozoic evolution of these regions. Nevertheless, the Paleozoic terrains of the Western Mediterranean Alpine Belts are located in a key position within the regional and should be considered in depth to clarify the geologic evolution of a wide region where, during the early to mid-Paleozoic, several ribbon continents and microplates detached from North Godwana (microplates) and several oceanic basins opened to be finally closed during Pangea amalgamation at the end of the Variscan Orogeny.

Actually, the analysis of their stratigraphic record and pre-Alpine tectonic structure may help to reconstruct the palaeogeography and geodynamics of the three Paleozoic oceans successively opened and closed to the North of Gondwana: Prototethys, Rheic and Paleotethys (Stampfli, 2000).

In the European Variscan massifs and in the Alps the oldest ocean, the Prototethys, opened during the Late Precambrian and was subducted since the latest Proterozoic up to the Ordovician-Silurian transition (Stampfli, 2000; Von Raumer et al., 2002; Stampfli and Borel, 2002; Berra and Angiolini, 2014). The Rheic Ocean opened in Ordovician-Silurian time and was completely subducted during the Devonian-earliest Carboniferous (Martínez-Catalán et al., 1997; Murphy et al., 2006, 2009, 2010; Linnemann et al., 2008; Arenas et al., 2007, 2009, 2015; Sánchez-Martínez et al., 2007, 2009; Díez-Fernández et al., 2010; Nance et al., 2010, among many others). The youngest Paleozoic ocean, the Paleotethys, opened during the Silurian-Devonian time-span and was subducted, preferentially, from the Early Carboniferous up to the end of the Triassic (Şengör, 1979, 1987, 1990; Şengör et al., 1980; Şengör and Yilmaz, 1981; Stampfli, 2000; Stampfli et al., 2002, 2003; Natal'in and Şengör, 2005; Robertson and Ustömer, 2009, among many others).

It is unclear, however, if the Paleotethys was the eastward continuation of the Rheic Ocean or if it constituted an independent ocean. According to models mainly based on plate tectonics reconstructions, the Paleotethys was located between the Gondwana, to the south, and the so-called European Hunic composite superterrane, to the north (von Raumer, 1998; Stampfli, 2000; Tait et al., 2000; Stampfli and Borel, 2002, 2004; Stampfli et al., 2002, 2003; von Raumer et al., 2002, 2003, 2009). This superterrane, later named Galatian Terrane (Von Raumer and Stampfli, 2008), was interpreted as a ribbon continent completely detached and drifted away from the Northern Gondwana margin, from Asia to South America, as a consequence of the Paleotethys opening.

According to other hypotheses mainly based on field studies, the ophiolite-bearing sutures found the

Variscan massifs of Spain and Morocco, cannot be ascribed to the Paleotethys, but to: *i*) the Rheic Ocean (Simancas et al., 2005, 2006; Arenas et al., 2007, 2009; Martínez-Catalán et al., 2009; Murphy et al., 2009, 2010; Keppie et al., 2010; Michard et al., 2010; Nance et al., 2010; Ribeiro et al., 2010; Braid et al., 2011), *ii*) smaller oceans like embayments related to the Rheic opening (*e.g.*, the South-Armorican Ocean concept of Paris and Robardet, 1990), *iii*) back-arc basins (Azor et al., 2008; Von Raumer et al., 2008; Simancas et al., 2009), or, finally, *iv*) older (Proterozoic) oceans (Murphy et al., 2006; El Hadi et al., 2010). Analogously, the Palaeozoic ophiolitic remnants of the proper Alps (Loth et al., 2001; Schaltegger et al., 2003) are not considered as belonging to the Paleotethys but as related to smaller oceans (Chamrouse ocean, Von Raumer and Stampfli, 2008). In this research programme we discuss the key position of one segment of the WMIAPTs, for defining the real extent of the Paleotethys Ocean and its margins in the North Gondwanic regions. Actually, they should preserve some evidence of the westward prolongation of the Paleotethys, or of its termination. Consequently, the study and correlation of the Palaeozoic volcano-sedimentary record of the WMIAPTs acquire a paramount importance. Particularly, the Calabria-Peloritani Southern Subterrane of Southern Italy here studied, is one of the southernmost WMIAPTs where updated detailed stratigraphic studies have recently been provided for two different Palaeozoic volcano-

sedimentary successions, those of the Stilo Unit (southern Calabria: Navas-Parejo et al., 2009a, b) and of the Longi-Taormina Unit (Peloritani Mts.:Rodríguez-Cañero et al., 2013; Somma et al., 2013). These two different successions are composed of slightly metamorphosed CambrianOrdovician? siliciclastic rocks hosting calc-alkaline volcanic rocks (Upper Ordovician in age in the Longi-Taormina Unit, Trombetta et al., 2004) and undated alkaline volcanics, capped by upper Silurian-Devonian metacarbonates. Both successions end with Carboniferous black cherts (lydites) and Culm-like siliciclastic facies (Navas-Parejo et al., 2009a, b; Rodríguez-Cañero et al., 2013; Somma et al., 2013). We focus our attention on the Stilo and Longi-Taormina Units, as they show the less metamorphosed and best-preserved Palaeozoic volcano-sedimentary successions of the Southern Subterranean of the Calabria-Peloritani Terrane.

Particularly:

i) we'll attempt to better define the geochronological age of the Longi-Taormina Unit alkaline and calc-alkaline suites by using Sensitive High Resolution Ion Microprobe (SHRIMP) analysis of zircon;

ii) we'll propose a stratigraphic synthesis of the Stilo Unit and Longi-Taormina Unit based on recent stratigraphic data (Navas-Parejo et al., 2009a, 2009b; Rodríguez-Cañero et al., 2013; Somma et al., 2013b) integrated by geochronological dating;

iii) we'll propose a correlation between these two Palaeozoic successions and other better known WMIAPTs successions in the Alps (Schönlaub, 1992, 1997, 1998, 2000; von Raumer and Neubauer, 1993; Neubauer et al., 1994; Schönlaub and Heinisch, 1994; von Raumer, 1998; Schönlaub and Histon, 1999, 2000; Neubauer and Handler 2000; Neubauer, 2002, among many others) and in the Betic Cordillera (Herbig, 1983, 1984; Rodríguez-Cañero, 1993; Martín-Algarra et al., 2004); Menorca: Bourrouilh, 1983), as well as in the Variscan terranes of Sardinia (Carmignani et al., 1994; Giacomini et al., 2006; Oggiano et al., 2010) and in the Variscan Massifs now outcropping in the European and African Alpine-Mediterranean foreland (Michard, 1976; Piqué, 1994; Dercourt, 2000; Gibbons and Moreno, 2002; Vera, 2004; Hoepffner et al., 2005, or Murphy et al., 2009, among many others); iv) and, finally, we'll propose a reconstruction of the environmental, palaeogeographic, and geodynamic evolution undergone by the Stilo Unit and Longi-Taormina Unit Palaeozoic volcanosedimentary successions, and will give new insights on the paleogeography of the Calabria-

Peloritani Southern Subterranean in the frame of Gondwanaland. This latter topic has been addressed taking into account the progress in the study of other WMIAPTs and Variscan massifs, where the Palaeozoic palaeogeography and geodynamics are currently better known (Paris and Robardet, 1990; Schönlaub, 1992, 1997, 1998, 2000; von Raumer, 1998; Neubauer and Handler, 1999; Schönlaub and Histon, 1999 and 2000, Stampfli, 2000; Stampfli and Borel, 2002, 2004; Stampfli et al., 2002; Gutiérrez-Alonso et al., 2003, 2008; Robardet, 2003; von Raumer et al., 2002, 2003, 2009; Martín-Algarra et al., 2004, 2009a, 2009b; Torsvik and Cocks, 2004; Cocks and Torsvik,

2006; Simancas et al., 2005, 2006, 2009; Von Raumer and Stampfli, 2008; Ballèvre et al., 2009; Martínez-Catalán et al., 2009; Michard et al., 2010; Rodríguez-Cañero et al., 2010; Sarmiento et al., 2011, and references therein).

The program includes the following activities:

- a. Bibliographic research of existing literature.
- b. Search of outcrops of Paleozoic carbonate successions for litho- and biostratigraphic analyses in the Calabria-Peloritani Arc.
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