



COMMEMORATION OF THE EMERGENCE OF THE GEOLOGICAL SOCIETY OF SPAIN COMMISSION ON TECTONICS

Commemoración de la creación de la Comisión de Tectónica de la Sociedad Geológica de España

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Abstract: *In the 1980s, and after years of socio-political instability, several circumstances had given a strong impetus to geological studies in Spain. Among them, the generalized growth of Spanish universities, including Geology faculties and departments. Several emerging issues in Structural Geology were object of research, discussion and controversy. Within this framework, a group of structural geologists promoted the Commission on Tectonics (CT) in the bosom of the recently created Geological Society of Spain. The CT officially started in June 1989, through a constitutional meeting at the Autonomous University of Barcelona. This was followed by the first annual field trip of the CT, hold in Cap de Creus. Since then, the CT has organized uninterrupted annual meetings and field trips through which the main issues of the structural geology of Spain and neighbouring territories have been shared and discussed. The organization of field trips has involved a large number of structural geologists. At present, the CT has 150 members. The achievement of a better gender balance and the generational renewal are key issues that will ensure its future relevance. We aim to pay tribute to the people who allowed the emergence and survival, through the last 30 years, of this remarkable scientific initiative.*

Keywords: *Structural Geology, Tectonics, tribute.*

Resumen: *A finales de la década de 1980, y después de años de inestabilidad sociopolítica, varias circunstancias habían dado un fuerte impulso a los estudios geológicos en España. Entre estos, cabe destacar el crecimiento generalizado de las universidades españolas, incluidas las facultades y departamentos de Geología, el plan de cartografía geológica en curso (MAGNA) del Instituto Geológico y Minero y la adquisición de las primeras imágenes sísmicas a gran escala del subsuelo a través de programas internacionales (como el perfil ECORS). Un gran número de temas emergentes en Tectónica y Geología Estructural fueron objeto de investigación, discusión y controversia, después de la aceptación de la Teoría de la Tectónica de Placas de la década de 1960. En este contexto, un grupo de geólogos estructurales impulsaron la Comisión de Tectónica (CT) en el seno de la recientemente creada Sociedad Geológica de España. La creación de la CT se propuso durante el segundo Congreso Geológico de 1988 en Granada y se hizo oficial en junio de 1989, en una reunión constitutiva en la Universitat Autònoma de Barcelona, que fue seguida por la primera excursión anual de la CT, celebrada en Cap de Creus. Desde entonces, la CT está coordinada por un Comité Ejecutivo de tres miembros que se renueva cada dos años y ha organizado reuniones y salidas de campo anuales ininterrumpidas a través de las cuales se han explorado, compartido y discutido los principales temas de la geología estructural de España y territorios vecinos. Tanto la coordinación como la organización de las excursiones han involucrado a un número elevado de geólogos estructurales. En la actualidad, la CT cuenta con 150 miembros. El logro de un mejor equilibrio de género y la renovación generacional son probablemente cuestiones clave que garantizarán su relevancia futura. Nuestro objetivo es rendir homenaje a las personas que permitieron la creación y supervivencia durante los últimos 30 años de esta notable iniciativa científica.*

Palabras clave: *Geología Estructural, Tectónica, homenaje.*

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Introduction

It has been 30 years from the foundation of the Commission on Tectonics (CT) of the Geological Society of Spain (SGE). In this introductory paper, we briefly review the international and national scientific and academic context of the early years of such commission, recalling some of the key issues that accompanied and allowed its emergence. Our main aim is to contribute to maintain alive the history of our discipline. The priceless effort made by founders and first members of this group is only fairly acknowledged when the historical framework is overviewed. We are convinced that recognizing the challenges that accompanied the first years of this commission will motivate next generations to give value and keep the spirit of moving forward, sharing and discussing knowledge and enjoying annual field trips, as it has been done without interruption for already 30 years.

The birth of the Commission on Tectonics. Historical framework

The initiative of establishing a specific commission on Tectonics (CT) within the SGE arose from informal meetings between structural geologists from several Spanish universities during the second half of the 1980s. The promoters of this initiative were members of the SGE. Through the creation of a CT, they envisaged the possibility of establishing continuous or regular contact between people interested in Tectonics and Structural Geology, as well as facilitating the exchange of ideas and experiences among them.

The SGE was founded in 1985. Three years later, in 1988, the 2nd Geological Congress of Spain was held at the University of Granada under the mandate of the 2nd President of the SGE, Juan Antonio Vera. It was at its General Assembly (July 1st, 1988) that the birthing of the CT was proposed, following a request by Pere Santanach and Francisco González Lodeiro. Their proposal was supported by a nominal list of 30 members of the SGE who would initially be integrated into the CT. The Assembly unanimously approved the creation of the CT, which was formally founded a year later, on June 15th, 1989, at the Autonomous University of Barcelona.

Worldwide landmarks of Structural Geology and Tectonics in the 1980s

The significant advance in Structural Geology and the establishment of modern Tectonics during the 1970s and 1980s should be framed in the formulation of Plate Tectonics Theory in late 1950s and early 1960s, which represented a complete twist on many concepts (Julivert *et al.*, 2003). In the 1980s, there was a vast number of emerging issues in Tectonics and Structural Geology that were object of research, discussion and controversy (see Tikoff *et al.*, 2013). Some of the most relevant subjects that are worth to mention are orogens classification, geometry and mechanics of fold and thrust belts, shear zone kinematics and evo-

lution, strain analysis, vorticity and kinematic indicators, relationships between deformation and metamorphic processes, rheological controls on deformation, deformation mechanisms and evolution of fault rocks. This is reflected into numerous publications in the form of scientific articles and textbooks of great impact for the tectonics community, such as Ramsay and Huber (1983, 1987) milestone books. Other remarkable publications of the 1980s in this field are, for instance, Park (1983), Davis (1984), Suppe (1985), Cox and Hart (1986) and Lisle (1988).

In that times, all geoscientific disciplines increasingly benefited from the advances in Geophysics, Geochemistry, Mathematics, Engineering and Computer technologies. In particular, the acquisition of reflection seismic projects through the collaboration of several countries or institutions favored the generation of new geotectonic models that changed our vision of the Earth's interior structure. The ECORS seismic profile in the Pyrenees (Choukroune and ECORS Team, 1989) is an example of how a bilateral (Spanish-French in this case) cooperation programme during the second half of the 1980s represented a great forward step into the understanding of Alpine geodynamics, shedding light into the plate subduction phenomena.

National and international societies, commissions and field trips

The involvement of structural geologists into groups devoted to the discussion of tectonic issues and the organization of specialized meetings started to develop worldwide in the 1970s and proliferated during the 1980s. Most probably, the CT of the SGE was partly inspired in the UK Tectonic Studies Group (TSG), which was created in the early 1970s as a discussion forum on Structural Geology and Tectonics, affiliated to the Geological Society of London. The TSG does not have a formal membership, so that organization and participation in meetings, conferences, workshops and field excursions is not restricted to a list of associates. The CT operates basically in the same way, but its annual meeting is only focused on the area where the field trip is held and does not represent a forum to present and share scientific communications. Another example of successful series of conferences is the DRT (Deformation, Rheology and Tectonics), which provides a main forum in Europe where field geologists, experimentalists and modellers can debate the problems and questions posed by natural structures and microstructures (De Meer *et al.*, 2002). First DRT meeting took place in Leiden (Netherlands) in 1976, followed by Barcelona (1979) and it is taking place biannually since the 1985 meeting in Utrecht (Netherlands).

Structural Geology and Tectonics in Spain in the 1980s

The significant scientific advance that occurred in most European countries and in North America in the 1970s, did not arrive in Spain until the first half of the 1980s. The previous decade was characterized in Spain by the political and social instability of the first years of the transition

(from Franco's death in 1975 until 1982 with the first socialist government). The project of the National Geological Map at a scale of 1:50,000 (Plan MAGNA) developed in the 1970s, was one of the “scientific engines” having a relative large impact on the development of geological knowledge in Spain. It allowed many research groups to carry out part of their work in times of scarce funding. This programme favored the contact between different research groups and different disciplines (Pérez-Estaún, 2005). In 1983, the Geology and Mining Institute of Spain (IGME) published a compilation of the Geology of Spain in two volumes (Comba, 1983) and, in 1984, this institute also created training scholarships.

The Spanish official investment in scientific projects, partially sponsored through international agreements as the Fulbright programme, started to increase by the late 1970s. Some structural geologists were involved in projects supported by the International Geological Correlation Programme (IGCP) which had been set in 1972 as a UNESCO programme with the aim of facilitating cooperation among geoscientists across national boundaries (joint research work, workshops and conferences). However, it was not until 1982 that the amounts invested through the CAICYT (Commission for the Assessment on Scientific and Technical Research) remarkably increased and became comparable to those of neighbouring countries (Romero de Pablos and Santasmases, 2008). In 1986, the Law of Promotion and General Coordination of Scientific and Technical Research (the so-called Law of Science) was approved. This law, for instance, allowed the Spanish structural geologists to access to grants for research projects. That year, Spain entered the European Economic Community which some years later facilitated exchanges between students and scientist through several european programmes as the European Union Erasmus programme.

In the 1970s and mainly during the 1980s, in the Spanish universities of Madrid, Barcelona, Oviedo, Salamanca, Granada and Basque Country there was a renovation of the teaching staff and new centres were created, such as the Earth Sciences Department at the University of Zaragoza. Thus, many sections or faculties of Geology were nourished by emerging researchers (Julivert, 2014) and the relocation of some of the *Catedráticos* (professors) promoted collaborations between universities that persisted in the following years. The increasing number of geologists doing research at the universities, Scientific Research Council (CSIC) and also at the IGME much contributed to place the Spanish research in Geology in a position comparable to that of our neighbouring countries (Santanach, 2015). Consequently, from the mid 1980s, the main geological units of the country start being defined mainly by national geologists, as opposed to former definitions mostly influenced by foreigner geologists. Some of these researchers and professors were the main promoters of the CT of SGE. Indeed, some of them had received advanced training in foreign research centers and did later extensively influenced the subsequent development of Structural Geology in their respective universities in Spain. These are the cases of Andrés Pérez-

Estaún (University of Oviedo, moved to CSIC-Institut Jaume Almera in Barcelona in 1994) and Jordi Carreras (University of Barcelona, moved to Autonomous University of Barcelona in 1984). They both had attended in 1974 a Master of Science in Structural Geology and Rock Mechanics at the Imperial College of Science and Technology (University of London) where they learnt from expert structural geologist as John Cosgrove, Stan White, Ernest Rutter, Janet Watson, Martin Casey and Mike Coward. Pere Santanach (University of Barcelona) also received specialized training in France and Germany at the universities of Montpellier (supervised by Maurice Matheron) and Clausthal-Zellerfeld, respectively. Also, the doctoral theses of Fernando Bastida and Javier Álvarez Pulgar (University of Oviedo, 1980) laid the foundations of all studies on folding that have been made later in Oviedo (Aller Manrique, 2009). Later on, the contributions of José Ramón Martínez Catalán and Francisco González Lodeiro to the tectonics of the Iberian massif constituted a remarkable benchmark, whereas in the Betics, a change of paradigm was introduced with the extensional tectonics perspective by Víctor García Dueñas, Miguel Orozco and Florencio Aldaya.

All these achievements in both research funding and human resources lead in the second half of 1980s to a significant rise in the number of contributions to scientific publications. In the field of Tectonics, this was characterised by an increase in publications in specialized SCI journals by authors affiliated to Spanish centers. Moreover, in 1986 the SGE journal *Geogaceta* started its publication. The

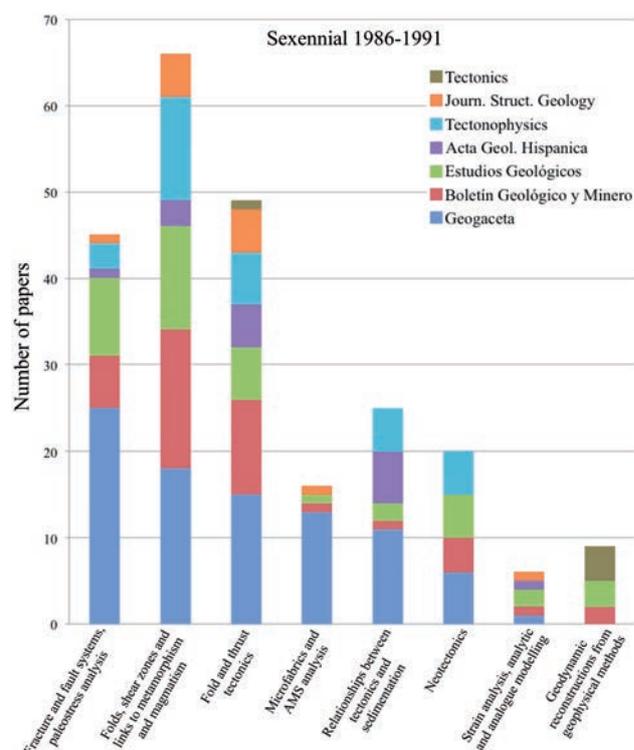


Fig. 1.- Number of Tectonics-related articles in four Spanish journals and three specialized SCI journals by authors affiliated to Spanish institutions in the period 1986–1991, ordered by thematic areas, and using *Geogaceta* papers as a reference basis.

SOCIEDAD GEOLOGICA DE ESPAÑA
Boletín Informativo N° 3
Mayo de 1989

Comisión de Tectónica

LA REUNION CONSTITUYENTE DE LA COMISION DE TECTONICA DE LA SGE SE CELEBRARA EL PROXIMO DIA 15 DE JUNIO DE 1989, A LAS 15 H., EN EL DEPARTAMENTO DE GEOLOGIA DE LA UNIVERSIDAD AUTONOMA DE BARCELONA (BELLATERRA).

LOS PUNTOS DEL ORDEN DEL DIA DE LA REUNION SON :

- 1.- PRESENTACION.
- 2.- DISCUSION DE OBJETIVOS.
- 3.- PROPUESAS RELATIVAS A LOS CAMPOS DE ACTUACION DE ESTA COMISION Y A LA ORGANIZACION DE FUTURAS REUNIONES.
- 4.- ELECCION DE LOS CARGOS DE PRESIDENTE, VICEPRESIDENTE Y SECRETARIO DE LA COMISION.



LOS DIAS 16 Y 17 DE JUNIO, Y DENTRO DEL MARCO DE ESTA REUNION CONSTITUYENTE, SE EFECTUARA UNA SALIDA DE CAMPO PARA ESTUDIAR LAS MILONITAS Y ZONAS DE CIZALLA DEL CAP DE CREUS (MERCINICO DE LOS FIRINEUS ORIENTALES).

EL DESPLAZAMIENTO A CAP DE CREUS SE REALIZARA PREFERENTEMENTE EN DICHES PARTICULARES DE LOS ASISTENTES, ESTA PREVISTO PERNOCTAR EN LA ZONA DE CAP DE CREUS (ROSAS O CADAQUES).



LOS GASTOS DERIVADOS DEL ALOJAMIENTO Y MANUTENCION DE TODO ELLO CORRERAN A CARGO DE LOS ASISTENTES.

LOS MIEMBROS DE LA SOCIEDAD QUE, CON CARACTER PROVISIONAL HASTA SU CONSTITUCION DEFINITIVA, DIRIGEN LAS TAREAS DE ESTA COMISION SON :

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VICEPRESIDENTE: ANDRES PEREZ ESTAUN
SECRETARIO: FRANCESC SABAT

EN LA SGE SE HAN APROBADO ASIMISMO LAS SIGUIENTES COMISIONES, QUE TAMBIEN CON IGUAL CARACTER PROVISIONAL ESTAN DIRIGIDAS POR

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Boletín de Adhesión a la Comisión de Tectónica de la S.G.E.
Deseo adherirme a la Comisión de Tectónica de la Sociedad Geológica de España.

Nombre: _____
Dirección: _____

Centro de Trabajo: _____

 ESTOY INTERESADO EN ASISTIR A LA REUNION CONSTITUYENTE: SI NO
IDEM IDEM " A LA SALIDA DE CAMPO: SI NO

INDICAR :



* PRECISO TRANSPORTE PARA EL TRAYECTO DESDE BARCELONA A CAP DE CREUS: SI NO



* DISPONGO DE _____ PLAZAS LIBRES EN MI COCHE QUE PUEDEN SER UTILIZADAS POR ALGUN COMPAÑERO EN EL DESPLAZAMIENTO A CAP DE CREUS.



* PRECISO RESERVA DE HOTEL EN CAP DE CREUS PARA LA NOCHE DEL 15 LA NOCHE DEL 16

ENVIAR ESTE BOLETIN A
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TODO ELLO, POR SUPUESTO, LO ANTES POSIBLE !



Fig. 2.- Scanned copy of the SGE Newsletter number 3 of May 1989 including an application form to become membership of the Commission on Tectonics and information about its forthcoming Constitutive Meeting and field trip to Cap de Creus. Notice the curious ideograms, which resemble present-day “emojis”, accompanying the explanations.

graph in Figure 1 shows the number of articles on Tectonics and Structural Geology issues published in *Geogaceta*, *Boletín Geológico y Minero*, *Estudios Geológicos* and *Acta Geologica Hispanica* and in three peer-review international journals on Structural Geology and Tectonics issues whose authors were affiliated to Spanish institutions in the period 1986–1991. We have considered these journals among the most frequently chosen by the Spanish structural geologists to publish their results, and thus, they serve as a representative sample that approximately reflects the state of development in this field by the Spanish researchers, although we agree that publications in other journals could have also been considered for a quantitative

approach. Articles have been grouped into eight main thematic issues. It is rather noticeable that most papers were focused on regional geology studies of regional fracture patterns, fold and thrust chains and tectonometamorphic belts, while neotectonics studies were less visible in the literature and theoretical and modelling approaches were just starting to emerge. In the case of the four national non-specialized journals, the percentages of Structural Geology papers with respect to the total amount of papers in the non-specialized Spanish journals published within the sexennial 1986–1991 are: *Geogaceta* 28%, *Estudios Geológicos* 15%, *Boletín Geológico y Minero* 12%, and *Acta Geologica Hispanica* 9%.

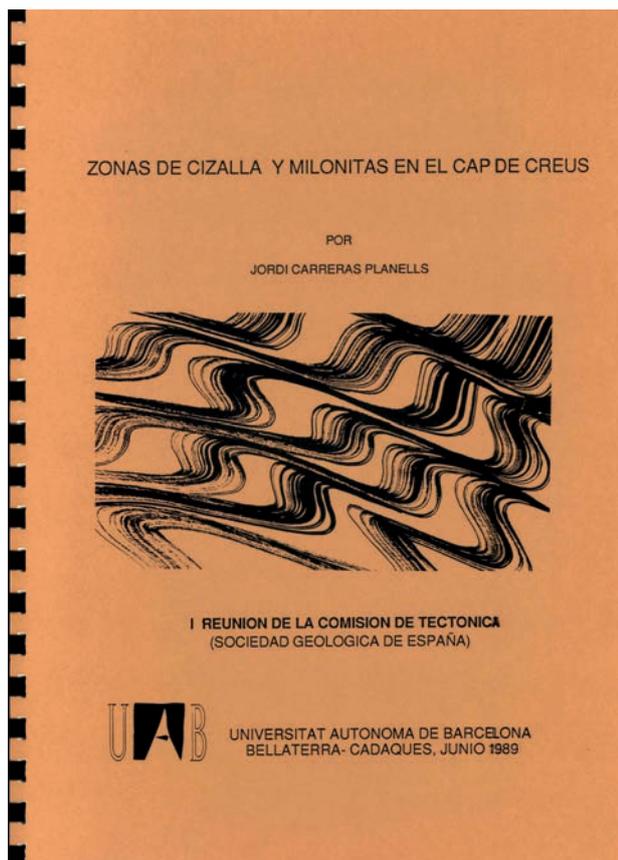


Fig. 3.- Front cover of the field book prepared and edited by Jordi Carreras for the Cap de Creus excursion (Carreras, 1989).

The 1989 Constitutive Meeting and the first excursion

The Constitutive Meeting of the CT took place at the Department of Geology, Autonomous University of Barcelona in Bellaterra on June 15th, 1989. As a curiosity, that was the same day of the 1989 European Parliament Election in Spain.

With the support of 68 scientists, the constituent meeting was chaired by a provisional table formed by Jordi Carreras (Autonomous University of Barcelona), Andrés Pérez Estaún (University of Oviedo) and Francesc Sàbat (University of Barcelona).

Francesc Sàbat, together with Carlos Martín Escorza (Museo Nacional de Ciencias Naturales, CSIC), the then secretary of the SGE, had done the previous tasks of organising this first meeting, including the distribution and management of membership applications (Fig. 2). During this first meeting, Jordi Carreras, Andrés Pérez-Estaún and Francesc Sàbat became respectively elected as President, Vice President and Secretary of the CT.

The meeting was followed by the first CT field trip which was held on June 16th and 17th, 1989 in the Cap de Creus peninsula (Eastern Pyrenees, Girona), organised by Jordi Carreras. The relevance of the Cap de Creus shear zones had been highlighted internationally with the International Conference on Shear Zones in Rocks, which Jordi Carreras had organised in 1979, ten years before the first CT meeting. Moreover, the Cap de Creus shear zones had already become rather famous among the international community of structural geologists with se-

veral articles published in scientific impact journals (e.g., Carreras *et al.*, 1977).

The 1989 excursion was entitled “Zonas de cizalla y milonitas del Cap de Creus” (Cap de Creus shear zones and mylonites, Fig. 3). The participants had the opportunity to see the best examples of shear zones and associated mylonitic rocks at Cap de Creus. On the first day, they visited the shear zones that affect a Variscan granodiorite pluton cropping out along the coast of the Roses lighthouse. On the second day, the group moved to the Nor-



Fig. 4.- Participants of the first SGE Commission on Tectonics field trip at Cap de Creus (June 1989), looking at shear zones at Cala Serena creek (above) and taking pictures of shear zones at el Llimac-Cala Prona (below). Both photographs courtesy of Pere Santanach.

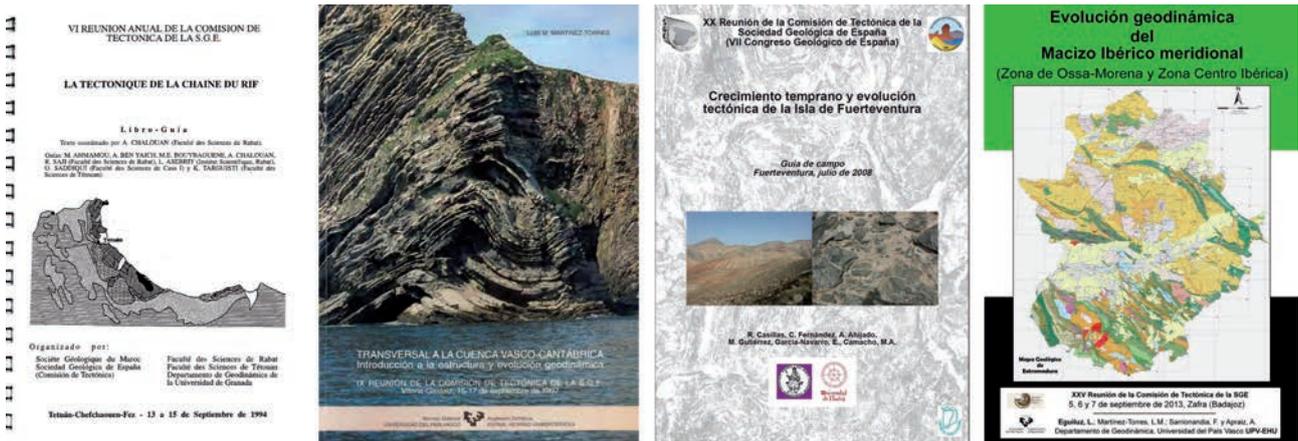


Fig. 5.- Examples of front covers of field books for the Commission on Tectonics excursions. From left to right: VI (1994), IX (1997), XX (2008) and XV (2013).

thern Cap de Creus mylonitic belt (Fig. 4), north of Cadaqués, where a spectacular anastomosing network of retrograding shear zones and associated structures affects mid- to high-grade metasedimentary rocks, migmatites and pegmatite dykes (see, as an example, the cover photograph of this special volume).

Ongoing activity

Since its creation 30 years ago, the CT has not ceased its activity, with the regular celebration of an annual meeting focused on a field trip that has always been carried out in the summer period, usually June or September. These field trips have focused on the Structural Geology of Spain and neighbouring territories (Portugal, Morocco, France, Italy). Table 1 shows the list of the 30 meetings held until present, some of them illustrated in a random selection of front covers of field guide-books shown in Figure 5.

The CT is handled by a committee composed of three representatives: a President, a Vice President and a Secretary. The members of this committee are chosen from among the members of the CT who attend its meetings and for a period of two years. The CT is ruled by the regulations of the SGE (Regulation of the Internal Regime of the SGE, section VII). The CT activities are coordinated by the three representatives, but, as mentioned before, organization and participation in meetings and field trips is not restricted to the CT members.

In 2018, the CT brings together about 150 scientists from several Spanish and foreign universities and research centres. Probably, the generational renewal and the achievement of a better gender balance are key issues that will ensure the future relevance of the CT. The gender balance of the CT has been slowly improving, although still remarkably under the equilibrium (31 women and 117 men). This unbalance has been also reflected in the configuration of the 15 consecutive CT committees, where only 13 of the



Fig. 6.- Group of participants to the XXIX SGE Commission on Tectonics Meeting held in Andorra (June 2017), entitled "Structure of the pre-Variscan materials of the Pyrenean Axial Zone in the Andorra transverse".

Year	Subject and Locality of the Excursion	Field trip leaders
1989	<i>Zonas de cizalla y milonitas en la península del Cap de Creus</i> / Shear zones and mylonites from the Cap de Creus peninsula	J. Carreras (UAB)
1990	<i>Las deformaciones alpinas en los materiales Nevado - Filábrides</i> / Alpine deformations in the Nevado - Filábrides materials	F. González-Lodeiro <i>et al.</i> (UGR)
1991	<i>Las deformaciones alpinas en el Sistema Central Español</i> / Alpine deformations in the Spanish Central System	G. de Vicente (UCM) & J.M. González-Casado (UAM)
1992	<i>Cizallamientos dúctiles de escala regional en la provincia de Salamanca</i> / Regional scale ductile shear zones in the Salamanca province	M.A. Diéz Balda <i>et al.</i> (USAL)
1993	<i>Estructura de las unidades orientales de la Zona Cantábrica</i> / The structure of the eastern units of the Cantabrian Zone	J.L. Alonso <i>et al.</i> (UNIOVI & IGME)
1994	<i>Geología de las cordilleras Bético-Rifeñas (Arco de Gibraltar y Mar de Alborán)</i> / Geology of the Betic and Rif cordilleras (Gibraltar Arc and Alboran Sea)	F. González Lodeiro (UGR) & A. Chalouan (U. Rabat)
1995	<i>Estructura y evolución mesozoico-terciaria de las Sierras de Cameros-Demanda (Cordillera Ibérica)</i> / Mesozoic-Tertiary structure and evolution of the Sierra de Cameros-Demanda Sierra (Iberian Chain)	A. Casas <i>et al.</i> (UNIZAR)
1996	<i>Tectónica de cabalgamientos y sedimentación sinorogénica en el Pirineo centro-occidental</i> / Thrust tectonics and synorogenic sedimentation in the central-western Pyrenees	A. Teixell & M.L. Arboleya (UAB)
1997	<i>Transversal a la cuenca Vasco-Cantábrica</i> / Transversal to the Basque-Cantabrian basin	L.M. Martínez-Torres (UPV/EHU)
1998	<i>Evolución estructural de las peridotitas de Ronda</i> / Structural evolution of the Ronda peridotites	J. Cuevas & J.M. Tubía (UPV/EHU)
1999	<i>La transición entre las zonas externas & internas en el Orógeno Varisco: Niveles estructurales y partición de la deformación</i> / The transition between external and internal zones in the Variscan Orogen: Structural levels and deformation partitioning	G. Gutiérrez-Alonso (USAL)
2000	Cabo Ortegal	A. Marcos <i>et al.</i> (UNIOVI)
2001	<i>Tectónica Varisca y sedimentación sinorogénica carbonífera de la región del Pisuerga-Carrión</i> / Variscan tectonics and Carboniferous synorogenic sedimentation of the Pisuerga-Carrión region	R. Rodríguez (IGME)
2002	<i>Estructuras de colapso extensional en el Dominio Alborán. Región de La Axarquía - Sierra Tejeda (provincias de Málaga y Granada)</i> / Extensional collapse structures in the Alboran domain. La Axarquía - Sierra Tejeda region (provinces of Málaga and Granada)	M. Orozco (UG) & F.M. Alonso Chaves (UHU)
2003	Montagne Noire (Massif Central, France)	P. Matte (U. Montpellier) & J.Cuevas (UPV/EHU)
2004	<i>Estructura extensional cretácica e inversión terciaria en la región de Aliaga - Montalbán</i> / Cretaceous extensional structure and Tertiary inversion in the Aliaga - Montalbán region	C.L. Liesa <i>et al.</i> (UNIZAR)
2005	<i>Estructura de la acreción de dominios corticales en el suroeste del Macizo Ibérico</i> / Structure of crustal domains accretion in the southwestern Iberian Massif	F.M. Alonso Chaves <i>et al.</i> (UHU, UGR, UPO)
2006	<i>Transversal en el Norte de Portugal (Vila Real)</i> / Transversal to the North Portugal (Vila Real)	C. Coke (UTAD) & M. Orozco (UGR)
2007	<i>Organización tectónica del Arco de Gibraltar: estilos tectónicos y partición de la deformación en la cuña orogénica externa</i> / Tectonic organization of the Gibraltar Arc: tectonic styles and deformation partitioning in the external orogenic wedge	C. Balanyá <i>et al.</i> (UGR, UPO)
2008	<i>Crecimiento temprano y evolución tectónica de la Isla de Fuerteventura</i> / Early growth and tectonic evolution of the Island of Fuerteventura	R. Casillas <i>et al.</i> (ULL, UHU)
2009	<i>La mélanges del Porma. Implicaciones en la evolución estructural de la Zona Cantábrica</i>	J.L. Alonso <i>et al.</i> (UNIOVI, IGME)
2010	<i>Estructuras alpinas en la terminación occidental de los relieves del Orógeno Pirenaico y su relación con la sedimentación terciaria (Macizo Ibérico, NO Peninsular)</i> / Alpine structures in the western termination of the reliefs of the Pyrenean Orogen and its relationship with Tertiary sedimentation (Iberian Massif)	F. Martín-González (URJC) & N. Heredia (IGME)
2011	<i>De la compresión y extensión sinorogénica alpina hasta las rotaciones horarias en el Arco de Calabria</i> / From Alpine synorogenic compression and extension to clockwise rotations in the Calabrian Arc	I. Martín Rojas (UA) & R. Somma (U. Roma)
2012	<i>La estructura varisca a través de la Zona Asturoccidental- Leonesa (NO de la Península Ibérica)</i> / The Variscan structure through the West Asturian-Leonese Zone (NW Iberian Peninsula)	F. Bastida & J. Aller (UNIOVI)
2013	<i>Evolución Geodinámica del Macizo Ibérico meridional (Zona de Ossa-Morena y Zona Centro Ibérica)</i> / Geodynamic evolution of the southern Iberian Massif (Ossa-Morena and Central Iberian Zones)	L. Eguiluz & L.M. Martínez Torres (UPV/EHU)
2014	<i>Panorámicas para ilustrar un corte de la vertiente surpirenaica en la zona oblicua de pliegues y cabalgamientos de Ainsa</i> / Panoramas to illustrate a section of the south-Pyrenean slope in the folds and thrusts oblique zone of Ainsa	A. Pocoví (UNIZAR)
2015	<i>Estructura y evolución tectónica de la Unidad Parautoctona del Complejo de Morais y su influencia en la cuenca sinorogénica del Sinforme de Alcañices</i> / Structure and tectonic evolution of the Parautoctonous Unit of the Morais Complex and its influence on the sinorogenic basin of the Alcañices synform	E. González Clavijo & Í. Frois Dias da Silva (IGME)
2016	<i>De Avalonia al SW de Iberia: anatomía de una cuña orogénica varisca, el "rifting" proto-Atlántico y tectónica reciente</i> / From Avalonia to SW Iberia: anatomy of a Variscan orogenic wedge, the proto-Atlantic rifting and recent tectonics	F.M. Alonso Chaves <i>et al.</i> (UHU)
2017	<i>Estructura de los materiales prevariscos de la Zona Axial pirenaica en la transversal de Andorra</i> / Structure of the pre-Variscan materials of the Pyrenean Axial Zone in the Andorra transverse	P. Clariana <i>et al.</i> (IEA, IGME, UNIOVI, UB)
2018	<i>La zona de cizalla del Torcal: un laboratorio natural de transpresión con alto reparto de la deformación</i> / The Torcal shear zone: a natural laboratory of transpression with high deformation partitioning	M. Díaz-Azpiroz <i>et al.</i> (UPO, UGR)

Table 1.- Complete list of the 30 SGE Commission on Tectonics meetings held until present. Acronyms of universities/institutions: IEA (Institute of Andorran Studies), IGME (Geology and Mining Institute of Spain), UAB (Autonomous University of Barcelona), UAM (Autonomous University of Madrid), UB (University of Barcelona), UCM (Complutense University of Madrid), UGR (University of Granada), UHU (University of Huelva), UNIOVI (University of Oviedo), UNIZAR (University of Zaragoza), UPO (University of Pablo Olavide, Sevilla), UPV/EHU (University of the Basque Country), ULL (University of La Laguna), URJC (Rey Juan Carlos University), USAL (University of Salamanca), UTAD (University of Trás-os-Montes and Alto Douro).

total 45 executive positions were attained by women. According to the gender study made by Alonso-Zarza *et al.* (2008), Tectonics was the area of Earth Sciences with a lower number of female with respect to male professionals in Spain, only comparable with Stratigraphy. This fact could be closely related to the proportion of field activities that both disciplines have to undertake compared to other areas. The penultimate field trip of the CT, held in Andorra on summer 2017 (Fig. 6) was organized by a committee which included two early career female structural geologists (Pilar Clariana and Aina Margalef). The participation of women in the field trip was remarkable and could be indicative of some major changes in the coming future of the discipline. Obviously, this could only be achieved in correlation to changes in other steps of the scientific career as, for instance, the presence of women geologists in representative academic positions.

Further information about the objectives and activities of the commission can be obtained at the SGE website and on the recently created blog:

http://www.sociedadgeologica.es/comisiones_tectonica.html
<https://comisiontectonicasge.wordpress.com>

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References

- Aller Manrique, J., 2009. Mis recuerdos de la Facultad en los primeros 80. In: *50 años de Geología en la Universidad de Oviedo*, (F.J. Álvarez Pulgar, J. Ordaz Gargallo, Eds). Facultad y Departamento de Geología. Universidad de Oviedo, 190-193.
- Alonso-Zarza, A.M., Álvarez-Marrón, J., Calonge, A., Díaz, C., Díez-Balda, M.A., Gil-Peña, I., Gómez, M.I., 2008. Mujeres y Geología en España. *Geo-Temas*, 10: 1611-1614.
- Carreras, J., 1989. *Zonas de cizalla y milonitas en el Cap de Creus. I Reunión Comisión de Tectónica, S.G.E.*, Universitat Autònoma de Barcelona, 71 p. + 2 anexos.
- Carreras, J., Estrada, A., White, S., 1977. The effect of folding on the c-axis fabrics of a quartz mylonite. *Tectonophysics*, 39: 3-24.
- Choukroune, P., ECORS Team, 1989. The ECORS Pyrenean deep seismic profile reflection data and the overall structure of an orogenic belt. *Tectonics*, 8: 23-39.
- Comba, J.A. (coord.), 1983. *Libro Jubilar J.M. Ríos. Geología de España* (2 vol.). Instituto Geológico y Minero de España. 656 p. – 752 p.
- Cox, A., Hart, R.B., 1986. *Plate Tectonics, How it works*. Blackwell Scientific Publications, Oxford, 392 p.
- Davis, G.H., 1984. *Structural geology of rocks and regions*. John Wiley & Sons, 492 p.
- De Meer, S., Drury, M.D., De Bresser, J.H.P., Pennock, G.M., 2002. Current issues and new developments in deformation mechanisms, rheology and tectonics. In: *Deformation Mechanisms, Rheology and Tectonics: Current Status and Future Perspectives*, (S. de Meer, M.D. Drury, J.H.P. De Bresser, G.M. Pennock, Eds). *Geological Society London, Special Publication*, 200: 1-27.
- Julivert, M., 2014. *Una historia de la geología de España*. Universitat de Barcelona, Barcelona, 295 p.
- Julivert, M., Reche, J., Zamarreño, I., 2003. Evolució de l'estudi de la geodinàmica. In: *Cinquanta anys de Geologia a la Universitat de Barcelona*, (M. Liesa, Ed). Facultat de Geologia. Universitat de Barcelona, 17-46.
- Lisle, R.J., 1988. *Geological structures and maps: A practical guide*. Pergamon Press, Oxford, 150 p.
- Park, R.G., 1983. *Foundations of Structural Geology*. Blackie, Glasgow, 135 p.
- Pérez-Estaún, A., 2005. El Plan MAGNA, movilizador de la investigación geológica en España durante las décadas de los setenta y ochenta del siglo XX: la experiencia del Noroeste de España. *Boletín Geológico y Minero*, 116: 307-323.
- Ramsay, J.G., Huber, M.I., 1983. *The Techniques of Modern Structural Geology, Volume 1: Strain Analysis*. Academic Press, London, 307 p.
- Ramsay, J.G., Huber, M.I., 1987. *The techniques of modern structural geology, Volume 2: Folds and fractures*. Academic Press, London, 391 p.
- Romero de Pablos, A., Santesmasas, M.J., 2008. *Cien años de política científica en España*. Fundación BBVA, 424 p.
- Santanach, P., 2015. Development of geology in Spain: a case study of a marginal science. Concerning "Una historia de la Geología en España" by M. Julivert. *Geologica Acta*, 13: 255-262.
- Suppe, J., 1985. *Principles of structural geology*. Prentice Hall, New Jersey, 537 p.
- Tikoff, B., Blenkinsop, T., Kruckenberg, S.C., Morgan, S., Newman, J., Wojtal, S., 2013. A perspective on the emergence of modern structural geology: Celebrating the feedbacks between historical-based and process-based approaches. In: *The Web of Geological Sciences: Advances, Impacts and Interactions*, (M.E. Bickford, Ed). *Geological Society of America Special Paper*, 500: 65-119.

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