Electronic Supplementary Material (ESI) for Analytical Methods. This journal is © The Royal Society of Chemistry 2018

Table S1: Articles mentioned and techniques employed for the study of medieval wall paintings

Reference and author	Wall paintings location	Sampling	In situ analysis	Raman	XRF/ ED-XRF	SEM(EDX/EDS), TEM	FTIR/FTIR-ATR	XRD	IR- thermography	Colour measurements	Nir-UV-Vis reflectance	LIBS	PIXE	tGC/MS	HPLC/TLC	IC/ICP-MS/LA- ICPMS	FORS	MALDI-TOF	Information
48 Edwards <i>et al.</i> 1997	Chapter House of Sherborne Abbey, Holy Sepulchre Chapel in Winchester Cathedral, UK (12 th -16 th c.)	\checkmark		~															Pigments
49 Edwards <i>et al.</i> 1999	Convento de la Peregrina, Sahagun, (13 th c.), Church of SS. Cosmo and Damien, Basconcillos del Tozo, Spain (15 th c.)	\checkmark		√															Pigments
50 Edwards <i>et al.</i> 1999	Church of SS Cosmo and Damian at Basconcillos del Tozo, Spain, (15 th c.)	\checkmark		~															Pigments
51 Rull Perez <i>et al.</i> 1999	Convento de la Peregrina, Sahagun, Spain, (13th c.)	\checkmark		\checkmark				\checkmark											Pigments
52 Edwards <i>et al.</i> 2001	Monastery of San Baudelio, Spain, (12 th c.)	\checkmark		\checkmark															Pigments
53 Villar <i>et al</i> . 2006	Ermita de la Virgen del Valle, Iglesia Parroquial de Santa Maria la Rea, Iglesia Parroquial de los Santos Cornelio y Cipriano, Ermita de San Pelayo, Spain (15 th c.)	\checkmark		1															Pigments
54 Daniel <i>et al.</i> 2012	Church of Saint-Nicholas, Nogaro, (11 th c.), chapel of the abbatial house, Moissac, (12 th c.) cathedral of Saint Etienne Cahors, (13 th -14 th c.), cathedral of Saint-Andre Bordeaux, (14 th c.) chapel of Beynac Castle (Beynac-	V		~		✓													Pigments

	et-Cazenac, Dordogne, (15 th c.), Saint-Christophe church in Montferrand- du-Périgord, France													
55 Palet Casas <i>et</i> <i>al.</i> 1992	Chapels in the Catalan Pyrenees, (from 10 th c.)	\checkmark				\checkmark		\checkmark						Pigments
56 Pérez-Arantegui <i>et al.</i> 2013	St Juan Bautista, Ruesta, Zaragoza, Spain, (11 th -13 th c.)	\checkmark				\checkmark		\checkmark		\checkmark				Pigment
57 Lepot <i>et al.</i> 2006	Wall paintings Tournai Caterdal, Belgium, (13 th c.)	\checkmark												Pigments, binders, mortars, deca products
58 Marić- Stojanović <i>et al.</i> 2018	Church of the Holy Mother of God Hodegetria in Peć, Serbia, (14 th c.)	\checkmark		\checkmark		\checkmark								Pigment, binders, deca products
59 Clark <i>et al</i> . 2010	Church of Saint Eulalia of Unha, Spain, (16 th c.)	\checkmark		\checkmark		~	~							Pigment, plaste binders, deca products
60 Zucchiatti <i>et al.</i> 2004	Longobard temple of Cividale del Friuli, Italia) (8 th -9 th c.)	\checkmark		~		~					~			Pigments, mortar
61 Holclajtner- Antunović <i>et al.</i> 2016	Monastery of Žiča, Serbia, (13 th -14 th c.)	\checkmark		~	~	~	~							Pigments, mortar, binders
62 Gutman <i>et al.</i> 2014	Dominican Monastery in Ptuj, Slovenia, (14 th c.)	\checkmark		\checkmark										Pigments, deca products
63 Edwards <i>et al.</i> 2005	Church of St. Peter and St. Paul at Upton, UK, (13 th - 14 th c.)	\checkmark		~										Pigments, mortar
64 Minceva- Sukarova <i>et al.</i> 2007	Church of Sveta Bogorodica in Lešok, Macedonia, (12 th -15 th c.)	\checkmark		~										Pigments
65 Vandenabeele <i>et al</i> 2005	Chapel of Ponthoz, Belgium, (10 th -11 th c.)	\checkmark	\checkmark	\checkmark										Pigments, deca product
66 Perez-Rodriguez <i>et al</i> . 2014	Mirador de la Reina, Sevilla, Spain, (16 th c.)	\checkmark	\checkmark	\checkmark										Pigments, mortar, binder decay products
67 Deneckere <i>et al.</i> 2010	Cathedral of Our Lady's, Antwerp, Belgium, (15 th c.)		\checkmark	\checkmark	\checkmark									Pigments, deca products
68 Gebremariam <i>et al</i> . 2013	Yemrehanna Krestos Church, Ethiopia, (12 th c.)		\checkmark		\checkmark									Pigments

69 Ferrero <i>et al</i> .	Cistercian Monastery of															Pigments
2002	Santa Maria de Huerta, Soria, Chapel of the SantosCorporales of Daroca, Saragoza, Spain, (14 th -15 th c.)		√		~											
70 Sawczak <i>et al.</i> 2009	Little Christopher chamber in the Main Town Hall of Gdansk, Poland, (15 th c.)	\checkmark	\checkmark	\checkmark	\checkmark											Pigments, mortar, decay products
71 Syta <i>et al.</i> 2014	Cathedral of Faras, Nubia, (7 th –14 th c.)	\checkmark	\checkmark	\checkmark									\checkmark			Pigments
72 Lampakis <i>et al.</i> 2016	Monastery of Doussiko, Great Meteoro and St. Barbara, Greece, (16 th c.)	\checkmark		~			~									Pigments, binders
73 Zorba <i>et al.</i> 2007	Monastery of Karaach- Teke, Bulgaria, (10 th c.)	\checkmark		\checkmark			~									Pigments, mortar
74 Nord <i>et al</i> . 2017	Källunge and Havdhem stone churches, Gotland, Sweden, (12 th c.)	\checkmark				~							~			Pigments
75 Švarcová et al. 2009	Monastery at Sázava and the St. Jacob the Elder Church in Přepeře, Czech Republic, (14 th c.)	\checkmark	√			~		~							~	Pigments, decay products
76 Iordanidis <i>et al.</i> 2014	Agioi Anargyroi Gymna- siou and Agioi Apostoloi Eleousi churches, Kastoria Greece,	V		~		~										Pigments
77 Daniilia et al. 2000	Protaton Church on Mount Athos, Greece, (13 th c.)	\checkmark	\checkmark	~		~	~		~							Pigments, decay products
78 Sotiropoulou <i>et</i> <i>al.</i> 2008	Chapel of St. Euthymius Cathedral of Thessaloniki, Greece, (14 th c.)	\checkmark	\checkmark	~	\checkmark	~	~			\checkmark						Pigments, decay products
79 Cheilakou <i>et al.</i> 2014	Church of Theotokos in Meronas, Panagia Church at Patsos Crete, Greece, (14 th c.)	\checkmark	\checkmark			\checkmark	√							~		Pigments, mortar, binders, decay products
80 Apollonia <i>et al.</i> 2009	Chapel of St. Maxime, Challand St. Victor, Italy (15 th c.)	\checkmark	\checkmark	~	~	~								~		Pigments
81 Boularand <i>et al.</i> 2011	Repointings of Miravet Castle, Spain, 12 th century	\checkmark				\checkmark	\checkmark	\checkmark								Pigments

82 Kakoulli <i>et al</i> . 2014	Enkleistra of Saint	/	,	,	,	,	,			,		,				Pigments,
2014	Neophytos, Cyprus, Greece, (12 th c.)	\checkmark	\checkmark	√	\checkmark	\checkmark	\checkmark			\checkmark		\checkmark				technique
83 Mugnaini <i>et al.</i> 2006	Cathedral of Siena, Italy, (13th c.)	\checkmark		\checkmark		\checkmark		\checkmark								Pigments , mortars,
84 Hradil <i>et al.</i> 2014	Church of St. Gallus in Kuřívody, Northern Bohemia (13 th c.)	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark								Pigments, mortar, decay products
85 Chiari <i>et al.</i> 2004	Church of Saint Fiorenzo in Bastia, Mondovì (Italy) (15 th c.)	\checkmark						\checkmark								Pigments, mortar
86 Bidaud <i>et al.</i> 2008	Gozzoburg city palace, Krems, Austria, (13 th c.)	\checkmark				\checkmark	\checkmark	\checkmark								Pigments
87 Buzgar <i>et al.</i> 2014	Voronet, Monastery, Romania, (16 th c.)	\checkmark		√												Pigments
88 Aceto <i>et al.</i> 2012	Ala di Stura, Italy (16 th c.)	\checkmark		\checkmark		\checkmark										Pigments, mortar, decay products
89 Pérez-Alonso <i>et</i> <i>al</i> . 2006	Santa María de Lemoniz, Basque Country, Spain, (16 th c.)		\checkmark	\checkmark												Pigments, mortar, decay products
90 Damiani <i>et al.</i> 2014	St. Augustine Church, Siena, Italy, (14 th c.)	\checkmark		\checkmark		\checkmark										Pigments, mortar, decay products
91 Dominguez- Vidal <i>et al.</i> 2012	Palace of the Lions in the Alhambra, Spain, 13 th –15 th c.)		\checkmark	~												Pigments, decay products
93 Pereira-Pardo <i>et al.</i> 2016	Ribeira Sacra, Galicia, Spain, (16 th c.)	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	Pigments, mortar, binders, decay products						
94 Daniilia <i>et al.</i> 2009	Monastery of Christ Antiphonite in Cyprus, Greece, (15 th c.)	\checkmark		~		~	~									Pigments, mortar, decay products
95 Nevin <i>et al.</i> 2008	Church of Agios Sozomenos, Galata, Cyprus, Greece, (16 th c.)	\checkmark		~			~					\checkmark				Pigments, plaster, decay products
96 Hradil <i>et al.</i> 2013	St George Church, Kostol'any pod Tríbečom, Slovakia, 11th century		~		~		~	~							~	Pigments, mortar, binders, decay products
97 Emmenegger <i>et</i> <i>al.</i> 1986	Convent of St John at Mustair, Switzerland, (10th-16th c.)	\checkmark				\checkmark		~					\checkmark			Pigments, mortar, binders, decay products
98 Kotulanová <i>et</i>	Kostol'any pod Tríběcom,	\checkmark			\checkmark			\checkmark								Pigments,

al. 2009	Slovakia, (11 th c.)													mortar, decay products
99 Edwards <i>et al.</i> 2008	Winchester Cathedral, UK; (12 th c.)., Southwell Minster, Nottingham, UK; Norman monastery, (12 th -14 th c.) Stibbard Church, Stibbard, Cambridgeshire, UK, (14 th -15 th c.)	1		~										Plaster and mortars
100 Amato <i>et al.</i> 2017	Church of Santa Maria Antiqua al Foro Romano, Rome, Italy, (6 th c.)	\checkmark	~	~			~							Pigments, mortar, decay products
101 Robador <i>et al.</i> 2016	Seville Alcazar, Spain, (10 th -12 th c.)	~	~	✓	\checkmark	~		~						Pigments, mortar, decay products
102 Daniilia <i>et al.</i> 2008	St Stephen's monastery, at the Meteora, Greece (17th century)	√		√	~	~	~					~		Mortars, pigments, binders, decay products
103 Perardi <i>et al.</i> 2003	Chapel of St. Orso Priory palace, Aosta, Italy, (15 th c.)		~	~						~				Pigments, decay products
104 Hein <i>et al.</i> 2009	Churches from Mani Peninsula, Greece, (15 th c.)	\checkmark				~	~	~						Pigments, mortars, decay products
105 Veneranda <i>et</i> <i>al.</i> 2014	Assumption's church of Alaiza, Basque Country, Spain, (14 th c.)	~	~	~	~								~	Pigments, mortars, decay products
106 Fico <i>et al.</i> 2016	Santi Stefani crypt, Vaste, Italy,(10 th -14 th c.)	~		~			~						\checkmark	Pigments, binders, decay products
107 Andreotti et al. 2006	Monumental Cemetery of Pisa, Italy, (14 th c.)	~				~	~				√	~		Pigments, mortars, decay products
108 Iordanidis <i>et</i> <i>al</i> . 2011	Church of Agios Georgios Vounou, Nikolaos Kyritzi and Nikolaos Magaliou (14 th –17 th c.), Kastoria, Gr.	√		~		~								Pigments, decay products
109 Sfarra <i>et al.</i> 2016	Madonna con Bambino in the Piazza del Popolo in Fontecchio, Italy, (13 th - 15 th c.)	~	\checkmark	\checkmark		~	~			~				Decay products

110 Vallet <i>et al.</i> 2013	Wall paintings in the Chartreuse, Villeneuve- les-Avignon, France, (14 th c.)		\checkmark						√		✓				Pigments, decay products
111 Perez-Alonso et al. 2004	Santa María de Hermo church, Asturias, Spain, (15 th c.)	\checkmark		~			~								Pigments, mortars, decay products
112 Irazola <i>et al.</i> 2012	Saint Andrew Church ,Biañez, Saint John the Baptist Church Axpe, Basque Country,Spain, (16 th c.)	\checkmark	√	√	\checkmark	\checkmark	√								Pigments, mortars, decay products
113 Veneranda et al. 2014	San Martín de Tours' Church, Gaceo, Basque Country, Spain) (14 th -16 th c.)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark								Pigments, mortar, decay products
114 Madariaga <i>et</i> <i>al.</i> under review 2018	Church of Saint Stephen in the village of Ribera de Valderejo, Alava, Basque Country, Spain, (15 th -16 th c.)	\checkmark	~	~	\checkmark							~			Pigments, stones decay products,
115 Arnold <i>et al.</i> 1986	The abbey of St John at Mustair, Switzerland, (10 th -16 th c.)	\checkmark				\checkmark	\checkmark	~					\checkmark		Pigments, mortar, binders, decay products
116 Mairinger <i>et al.</i> 1986	The abbey of St John at Mustair, Switzerland, (10th-16th c.)	\checkmark				\checkmark	\checkmark	\checkmark					\checkmark		Pigments, mortar, binders, decay products
117 Maguregui <i>et al.</i> 2008	Church of Santa Maria de Hermo Asturias, Spain, (15 th c.)	\checkmark	\checkmark	\checkmark	\checkmark									\checkmark	Decay products
118 Edwards <i>et al.</i> 1999	Convento de la Peregrina in Sahagun Spain, (13 th c.)	\checkmark		\checkmark											Pigments, decay products
119 Salvadó <i>et al.</i> 2016	Saint Michael's Chapel from the Royal Monastery of Pedralbes (Barcelona) (14 th c.)	\checkmark				\checkmark		√				\checkmark			Pigment, mortar, decay products
120 Milanesi <i>et al.</i> 2006	Chapel of the Holy Nail in the medieval ex-hospital of Siena (14 th c.)	\checkmark				\checkmark									Pigments, decay products,
121 Milanesi <i>et al.</i> 2009	Chapel of the Holy Nail in the medieval ex-hospital of Siena (14 th c.)	\checkmark				\checkmark									Decay products
122 Tortora et al.	Monastery of Santo Spirito	\checkmark						Pigments,							

2016	in Ocre, L'Aquila, Italy, (13 th -14 th c.)													mortars, decay product
123 Dei <i>et al</i> . 1998	Church of San Pietro at Quaracchi, Italy, (14 th -15 th c.)	~					\checkmark	\checkmark						Pigments, decay products,
124 Costantini <i>et</i> al. 2018	Saint Stephen Church Ribera de Valderejo, Álava, Basque Country(15 th -16 th c.)	~	~	\checkmark	~	\checkmark								Pigments, mortar, decay products
125 Pérez-Alonso <i>et al.</i> 2004	Church of Santa Maria of Hermo, Asturias, Spain, (15 th c.)	\checkmark		\checkmark			\checkmark					\checkmark		Pigments, mortar, decay products