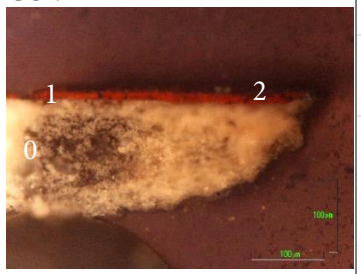
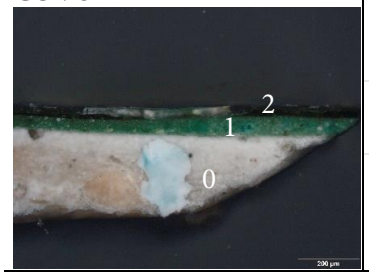
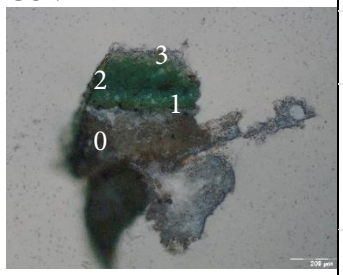
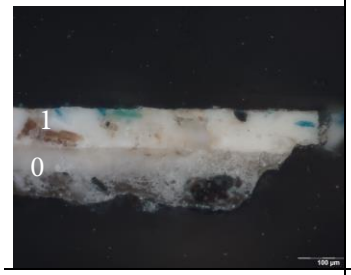
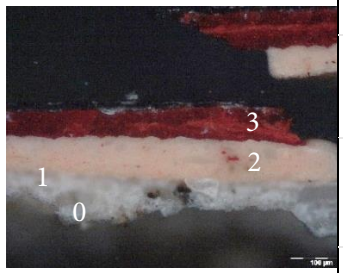
Table S1. Description of the micro-samples and the integrated analyses

	Painting title, date* and location	Sample code	Sampling area	Colour and typology	Investigations
Giovanni Santi	*Martyrdom of Saint Sebastian,* c.1487–1488; Urbino, Casa Raffaello	GSM1	Trousers of the first crossbowman, right leg	Red, highlighting	PLM, ESEM-EDX, FTIR, Raman, FTIR-ATR
		GSM2	Trousers of the second archer, left leg	Pink, highlighting	PLM, ESEM-EDX, FTIR, FTIR-ATR
		GSM3	Left sleeve of the first archer	Green, highlighting	PLM, ESEM-EDX, FTIR, FTIR-ATR
		GSM4	Trees behind St. Sebastian	Green	PLM, ESEM-EDX, FTIR, Raman, FTIR-ATR
		GSM5	Mountains, landscape, left of the tree	Light blue	PLM, ESEM-EDX, FTIR, FTIR-ATR
		GSM6	Blood drop, St. Sebastian's right leg	Red	PLM, ESEM-EDX, FTIR, FTIR-ATR
		GSM7	St. Sebastian's loincloth	Violet-blue	PLM, ESEM-EDX, FTIR
		GSM8	St. Sebastian's right calf	Reddish brown, shading	PLM, ESEM-EDX, FTIR
		GSM9	Back of the wood panel	Wood	PLM; ESEM
		GSM10	Sky, upper right side	Pale blue	PLM, ESEM-EDX, FTIR, FTIR-ATR
		GSM11	Rocks under St. Sebastian's feet	Brown, shading	PLM, ESEM-EDX, FTIR
		GSM12	Leg of the archer	Yellow repainting	GC-MS
		GSM13	Trousers of the first crossbowman, left leg	Red repainting	GC-MS
	Visitation, c.1488-1490; Fano, Santa Maria Nuova Church	SF1	Flesh tone of maid, back of St. Elisabeth, left wrist	Pinkish white	PLM, ESEM-EDX, Raman, FTIR-ATR, GC-MS
		SF2	First woman on the left, mantle	Green, shading	PLM, ESEM-EDX, FTIR-ATR, GC-MS
		SF3	Virgin's dress	Pale red	PLM, ESEM-EDX, FTIR-ATR
		SF4	St. Elisabeth's mantle	Lake red, shading	PLM, ESEM-EDX, FTIR-ATR, GC-MS
		SF5	St Joseph's mantle, right sleeve	Dark yellow, shading	PLM, ESEM-EDX, FTIR-ATR
		SF6	Virgin's mantle	Dark blue, shading	PLM, ESEM-EDX, FTIR-ATR
		SF7	Back of the panel, support	Wood	PLM; ESEM
		SF8	Protective layers	Reddish	PLM; ESEM-EDX
		SF9	Junction between the boards	Canvas	PLM, ESEM-EDX
	Tobias and the Archangel Raphael, c.1490-1494; Urbino, Casa Raffaello	GSS1	Tobias'robe	Green, shading	PLM, ESEM-EDX, FTIR, FTIR-ATR
		GSS2	Raphael's mantle	Yellow, shading	PLM, ESEM-EDX, FTIR
		GSS3	Raphael's cuff	Red	PLM, ESEM-EDX, FTIR-ATR
		GSS4	Raphael's robe	Violet-blue	PLM, ESEM-EDX, FTIR-ATR
		GSS5	Original support, right side	Canvas	PLM, ESEM-EDX
		GSS7	Sky, horizon, right side	White repainting	GC-MS
		GSS8	Sky, below the white cloud	Light blue repainting	GC-MS
Justus of Ghent	*Communion of the Apostles,* c.1473-1474*; Urbino, Galleria Nazionale delle Marche	CA2	Red mantle of the kneeling apostle	Red	PLM, ESEM-EDX, FTIR-ATR*
		CA7	Blue/violet Christ's robe	Blue/violet	PLM, ESEM-EDX, FTIR-ATR*

*[3,4,10]

Table S2. *Martyrdom of Saint Sebastian* – Integrated stratigraphic analyses

Sample code	Layer	Maximum thickness (μm)	Typology	Stratigraphic identification (PLM+ESEM-EDX+ μRAMAN)	FTIR and FTIR-ATR
GSM1 	2	8 μm	Red glaze layer	Red lake, vermilion, powdered glass	Partially hydrolysed esters of carboxylic acids (oil), carboxylates, Ca-oxalates, lead white, gypsum, Ca/Mg carbonate
	1	8 μm	Red layer	Vermilion, lead white, red lake Fe-based pigments	
	0	100 μm	Ground layer	Calcium sulphate	Gypsum, anhydrite, partially hydrolysed esters of carboxylic acids (oil and wax), carboxylates, calcium oxalates, proteinaceous material, Ca/Mg carbonate
		180 μm		Calcium sulphate, silicates	
GSM2 	2	16 μm	Red glaze layer	Red lake	Lead white, partially hydrolysed esters of carboxylic acids (oil), carboxylates, proteinaceous materials
	1	46 μm	Pink layer	Vermilion, lead white, red lake, silicate particles	
	0	140 μm	Ground layer	Calcium sulphate, silicates	Gypsum, anhydrite, proteinaceous material, partially hydrolysed esters of carboxylic acids (wax and oil), carboxylates, Ca-oxalates, Ca/Mg carbonate
GSM3 	2	40 μm	Green glaze layer	Cu-based pigments, silicates, chlorides	Verdigris basic (Cu-acetate basic), partially hydrolysed esters of carboxylic acids (oil), Ca-oxalates
	1	80 μm	Green layer	Cu-based pigments, silicates, lead-tin yellow, hematite	Verdigris basic, partially hydrolysed esters of carboxylic acids (oil), Ca-oxalates
	0	240 μm	Ground layer		Gypsum, esters of carboxylic acids (oil), proteinaceous material

GSM4 	3	10 μm	Green glaze layer	Cu-based pigments, lead white	Verdigris basic, partially hydrolysed esters of carboxylic acids (wax and oil), Ca-oxalates, gypsum, anhydrite
	2	50 μm	Green layer	Cu-based pigments, lead-tin yellow, orpiment, dolomite	
	1	44 μm	Green layer	Cu-based pigments, lead-tin yellow type I, cerussite, hydrocerussite, dolomite particles, chlorides	Proteinaceous materials, esters of carboxylic acids (mainly wax), gypsum, anhydrite, Ca-oxalates, verdigris basic
	0	140 μm	Ground layer	Calcium sulphate, Fe-based pigments	Gypsum, anhydrite, wax, calcium oxalates
GSM5 	1	50 μm	Blue layer	Lead white, azurite with Ag impurities, silicates, silica particles, calcite	Azurite, lead white, partially hydrolysed esters of carboxylic acids and proteinaceous material (egg), Ca-oxalates, gypsum
	0	40 μm 60 μm	Ground layer	Calcium sulphate, silica particles	Gypsum, anhydrite, partially hydrolysed esters of carboxylic acids (wax and oil), carboxylates, calcium oxalates, proteinaceous material
GSM6 	3	50 μm	Red layer	Red lake, powdered glass particles, vermilion, lead white	Silicate compounds, hydrated alumina, gypsum, calcium carbonate, proteinaceous materials, partially hydrolysed esters of carboxylic acids, carboxylates
	2	80 μm	Flesh layer	Lead white vermilion, lead-tin yellow, silicates	Lead white, partially hydrolysed esters of carboxylic acids (oil), carboxylates, natural resin
	1	10 μm	Priming layer		Lead white, hydrocerussite, partially hydrolysed esters of carboxylic acids (oil and wax), carboxylates, C-oxalates, proteinaceous material, gypsum
	0	80 μm	Ground layer	Calcium sulphate	Gypsum, anhydrite

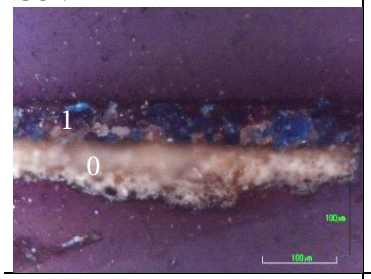
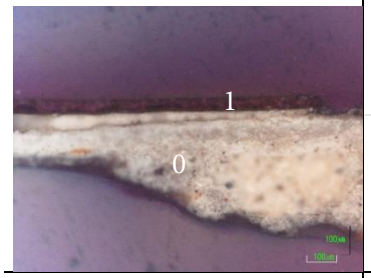
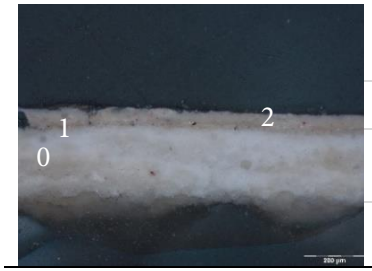
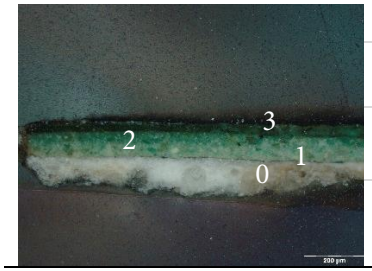
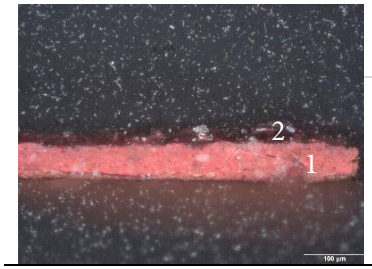
GSM7 	1	50 µm	Violet layer	Azurite, red lake, lead white	Azurite, partially hydrolysed esters of carboxylic acids and proteinaceous material (egg)
	0	55 µm	Ground layer	Calcium sulphate, rare Cu-based pigments, quartz particles	Gypsum, anhydrite, esters of carboxylic acids (wax and oil), Ca/Mg carbonate
GSM8 	1	55 µm	Brown layer	Fe-based pigments (ochre), vermilion, lead white, Cu-based particles	Lead white, almost totally hydrolysed esters of carboxylic acids (oil), carboxylates, gypsum, silicates
	0	400µm	Ground layer	Calcium sulphate, silicates	Gypsum, anhydrite, esters of carboxylic acids (oil), Ca/Mg carbonate
GSM 10 	1	55 µm	Blue layer	Azurite, lead white, dolomite particles	Azurite, esters of carboxylic acids and proteinaceous material (egg)
	0	450 µm	Ground layer	Calcium sulphate	Gypsum, anhydrite, partially hydrolysed esters of carboxylic acids (wax and oil), carboxylates, ca-oxalates, proteinaceous material, Ca-carbonate, Ca/Mg carbonate
GSM 11 	1	10 µm	Brown layer		Lead white, partially hydrolysed esters of carboxylic acids (oil), carboxylates, gypsum, Ca/Mg carbonate
	0	110 µm	Ground layer	Calcium sulphate, quartz particles	Gypsum, anhydrite, esters of carboxylic acids (wax and oil), silicates

Table S3. *Visitation* – Integrated stratigraphic analyses of samples

Sample code	Layer	Maximum thickness (μm)	Typology	Stratigraphic identification (PLM+ESEM-EDX+μRAMAN)	FTIR and FTIR-ATR
SF1 	2	60 μm	Pinkish layer	Lead white, vermilion, dolomite particles, colourless powdered glass, Fe-based pigments, red lake	Lead white, partially hydrolysed esters of carboxylic acids, carboxylates
			Underdrawing	Carbon black	
	1	5 μm	Priming layer	Lead white, Fe-based pigments (ochre)	Gypsum
	0	150 μm	Ground layer	Calcium sulphate, silica particles	Gypsum, proteinaceous material
SF2 	3	20 μm	Green glaze layer	Cu-based pigments, lead-tin yellow	Verdigris basic, esters of carboxylic acids, Ca-oxalates
	2	20 μm	Green layer	Cu-based pigments, lead-tin yellow	
	1	25 μm	Pale green layer	Lead-tin yellow, Cu-based pigments, hematite, calcite, silica particles	Verdigris basic, lead white, esters of carboxylic acids
	0	60 μm	Ground layer	Calcium sulphate, silica particles, lead white, Cu impurities	Gypsum
SF3 	2	15 μm	Dark red glaze layer	Red lake, vermilion, colourless powdered glass, bone black	Calcium carbonate, esters of carboxylic acids, proteinaceous materials, Ca-oxalates
	1	60 μm	Red layer	Vermillion, lead white, colourless powdered glass	Lead white, esters of carboxylic acids, proteinaceous material, Ca-oxalates

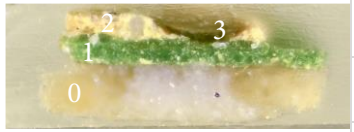
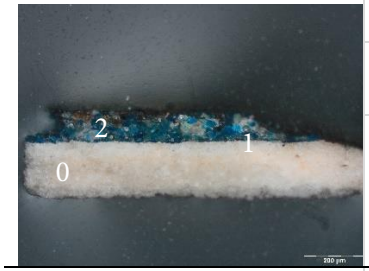
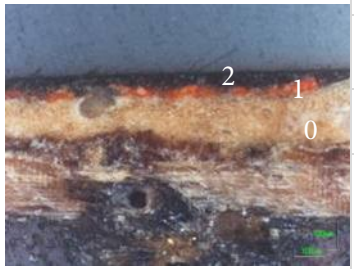
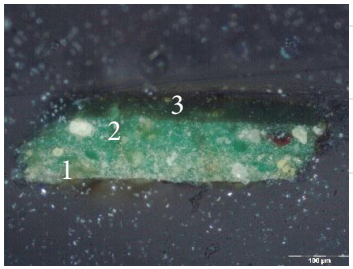
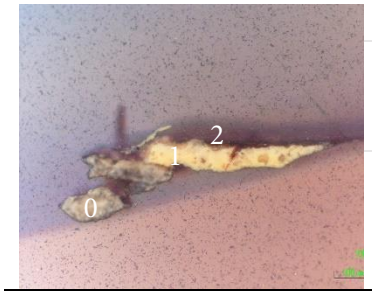
SF4 	2	85 µm	Red glaze layer	Red lake, lead-tin yellow, vermilion, colourless glass particles	Lead white, esters of carboxylic acids, proteinaceous material, hydrated alumina
	1	180 µm	Pink layer	Lead white, red lake, colourless glass particles	Lead white, partially hydrolysed esters of carboxylic acids, carboxylates
SF5 	3	8 µm	Brown glaze layer	Fe-based pigments (ochre)	
	2	60 µm	Yellow layer	Lead-tin yellow, Fe-based pigments	Silicates, esters of carboxylic acids, calcium carbonate
	1	60 µm	Green layer	Cu-based pigments, lead-tin yellow	Verdigris basic, carboxylates
	0	120 µm	Ground layer	Calcium sulphate	Anhydrite, proteinaceous material
SF6 	2		Blue layer	Azurite, silica particles, hematite	Azurite, esters of carboxylic acids, proteinaceous material, silicates
	1	5 µm	Priming layer	Lead white, orpiment, Fe-based pigments	
	0	180 µm	Ground layer	Calcium sulphate, silica particles, lead white particles?	Gypsum, calcium carbonate, esters of carboxylic acids, proteinaceous material
SF8 	2	70 µm	Brownish layer		Partially hydrolysed esters of carboxylic acids, carboxylates
	1	50 µm	Red layer	Pb-based red, calcium carbonate, silicates	Silicates, proteinaceous materials
	0	200 µm	Ground layer	Calcium sulphate, silicates	Gypsum, proteinaceous material
			Adhesive layer		Silicates, proteinaceous material, esters of carboxylic acids
			Support		Cellulosic material, Ca-oxalates

Table S4. *Tobias and the Archangel Raphael* – Integrated stratigraphic analyses

Sample	Layer	Maximum thickness (μm)	Typology	Stratigraphic identification (PLM+ESEM-EDX)	FTIR and FTIR-ATR
GSS1 	3	30 μm	Green glaze layer	Cu-based pigments, chlorides, orpiment	Verdigris basic, esters of carboxylic acids, silicates
	2	60 μm	Green layer	Cu-based pigments, lead-tin yellow, Fe-based pigments	
	1	50 μm	Light green layer	Cu-based pigments, lead white, lead-tin yellow, orpiment, glass particles	Verdigris basic, partially hydrolysed esters of carboxylic acids, barium sulphate
	0	55	Ground layer	Calcium sulphate, silica impurities	Partially hydrolysed esters of carboxylic acids, carboxylates, Ca-oxalates, gypsum, silicates, proteinaceous material
GSS2 	2	15 μm	Yellowish glaze	Earth pigments, bone black	
	1	83 μm	Yellow layer	Lead-tin yellow, hematite	Hydrolysed ester of carboxylic acids, carboxylates, Ca-oxalates, Ca-carbonate, silicates
	0	150 μm	Ground layer	Calcium sulphate	Hydrolysed ester of carboxylic acids, carboxylates, Ca-oxalates, gypsum

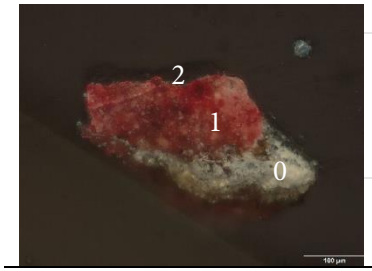
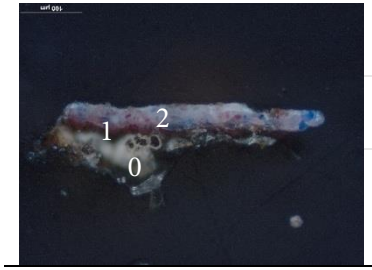
GSS3 	2	15 μm	Red glaze layer	Red lake, powdered glass particles	
	1	150 μm	Red layer	Red lake, lead white, powdered glass particles	Lead white, silicates and hydrated alumina, almost totally hydrolysed esters of carboxylic acids, carboxylates, Ca-oxalates
	0	110 μm	Ground layer	Calcium sulphate, aluminosilicates	
GSS4 	2	45 μm	Violet layer	Lead white, natural ultramarine, red lake	Lead white, esters of carboxylic acids, proteinaceous material, silicates, Ca-oxalates
	1	5 μm	Red layer	Red lake,	Calcium carbonate, silicates, proteinaceous material, Ca-oxalates
	0	110 μm	Ground layer	Calcium sulphate, silica	

Table S5 Relative percentage of the integrated areas respect the analytes detected by GC-MS analysis for the lipidic fraction.

Sample	CC9	C14:0	C16:0	C18:0	A/P	P/S
SF1	32,65	0,33	41,02	26,00	0,80	1,58
SF2	30,83	0,51	42,93	25,64	0,72	1,67
SF4	31,36	0,69	41,69	26,26	0,75	1,59
GSS7	22,30	9,36	42,70	25,64	0,52	1,67
GSS8	23,94	8,00	43,06	25,00	0,56	1,72
GSM12	26,74	2,4	44,43	26,43	0,60	1,68
GSM13	26,95	3,41	44,34	25,30	0,61	1,75

*The following labels are used: azelaic acid (CC9); miristic acid (C14:0; palmitic acid (C16:0); stearic acid (C18:0).
A/P refers to the ratio between azelaic and palmitic acids; P/S refers to the ratio between palmitic and stearic acids.