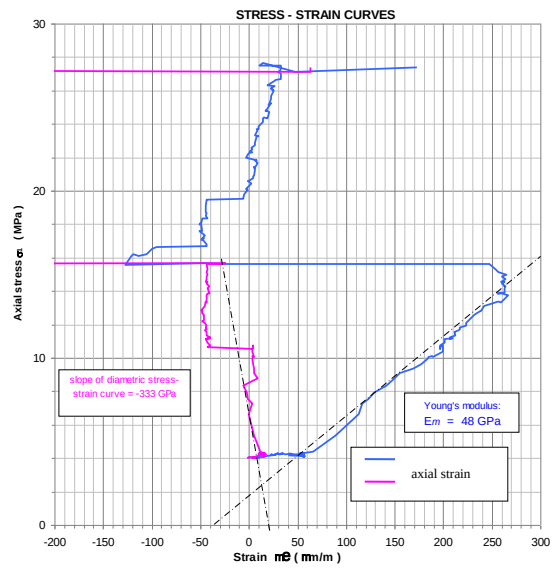
Supplementary Material 6

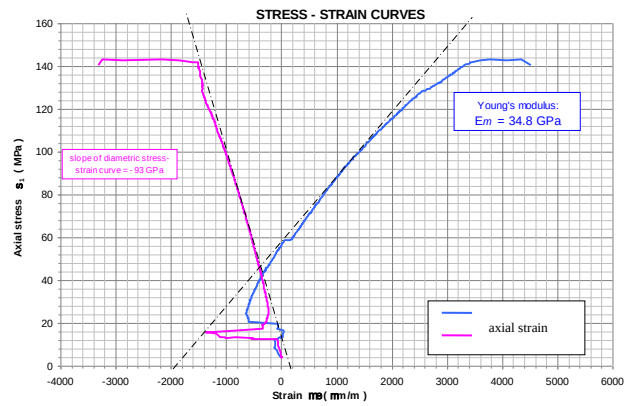
1 Laboratory tests on rocks

1.1 Stress-strain curves in compression tests

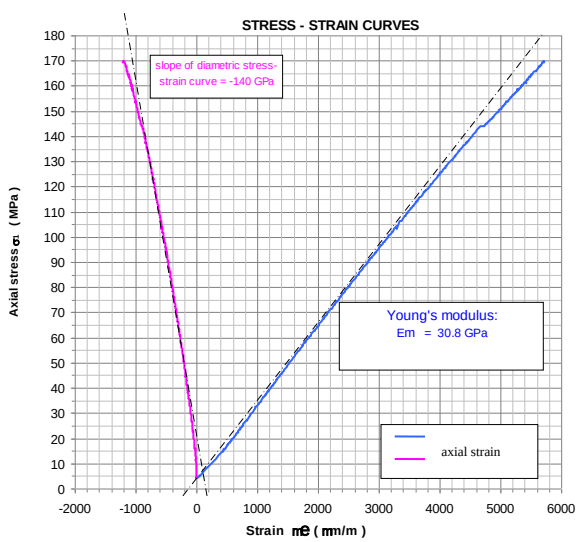
MAIOLICA - SPECIMEN VP10
UNIAXIAL COMPRESSION TEST



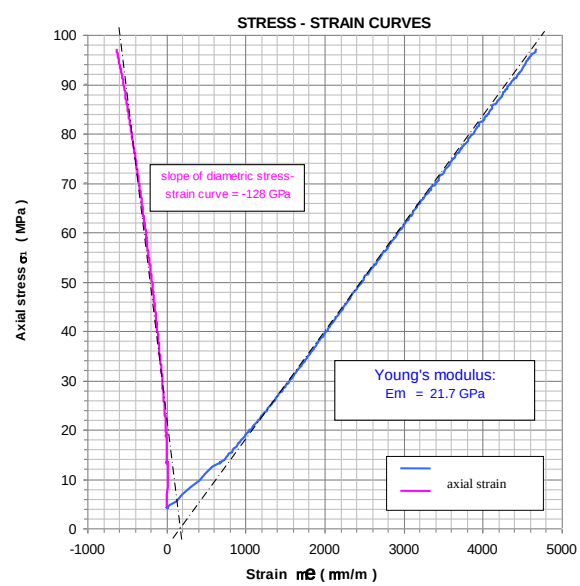
MAIOLICA - SPECIMEN T13A-A
TRIAXIAL COMPRESSION TEST s_3 = 8 MPa



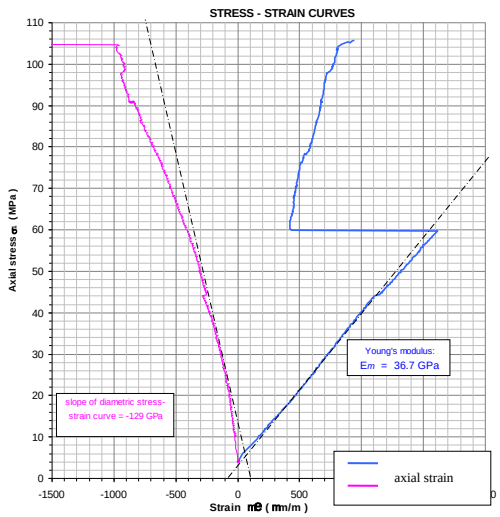
MAIOLICA - SPECIMEN T14A
UNIAXIAL COMPRESSION TEST



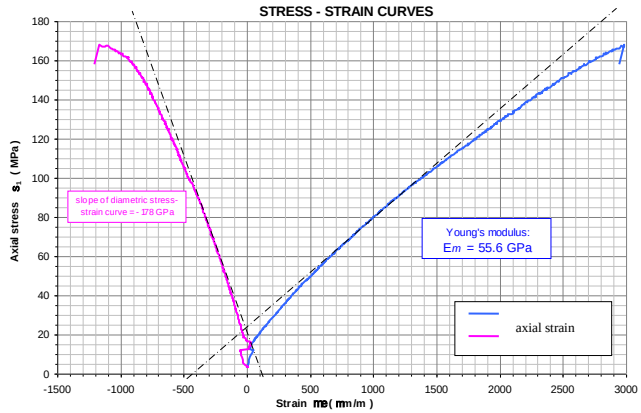
MAIOLICA - SPECIMEN T13A-B
UNIAXIAL COMPRESSION TEST



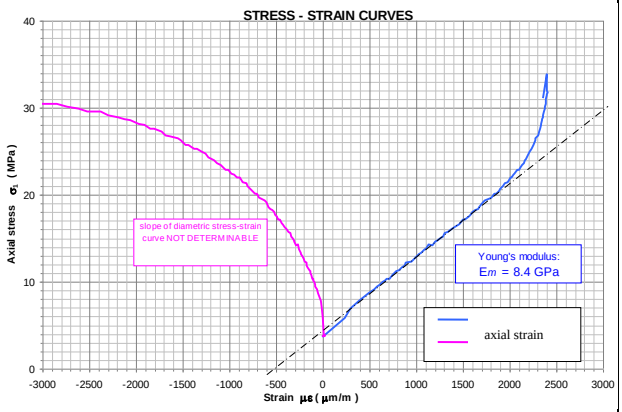
SCAGLIA ROSSA 1 - SPECIMEN AP20
UNIAXIAL COMPRESSION TEST



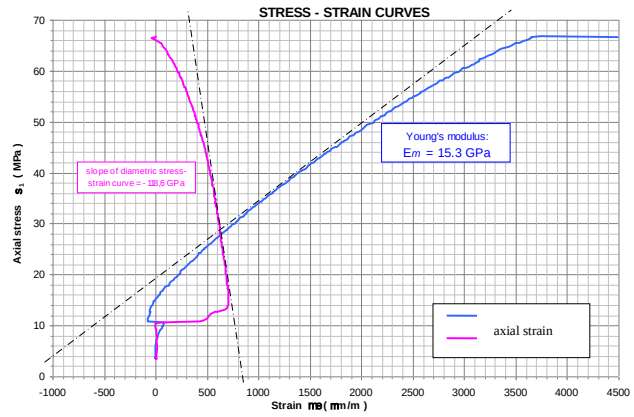
SCAGLIA ROSSA 1 - SPECIMEN T4A
TRIAXIAL COMPRESSION TEST s_3 = 8 MPa



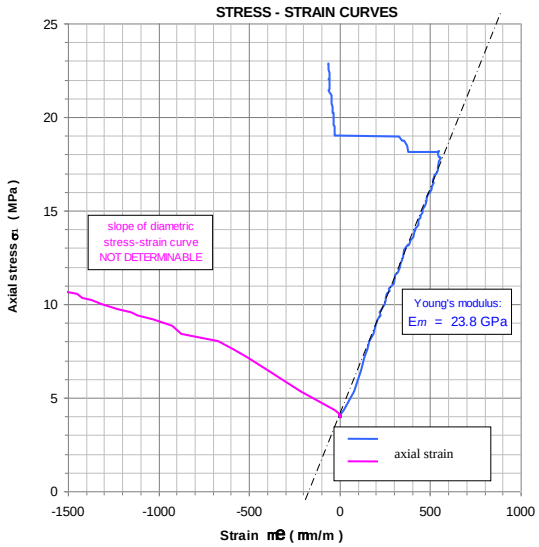
SCAGLIA ROSSA 2 - SPECIMEN VP18
TRIAXIAL COMPRESSION TEST s_3 = 3 MPa



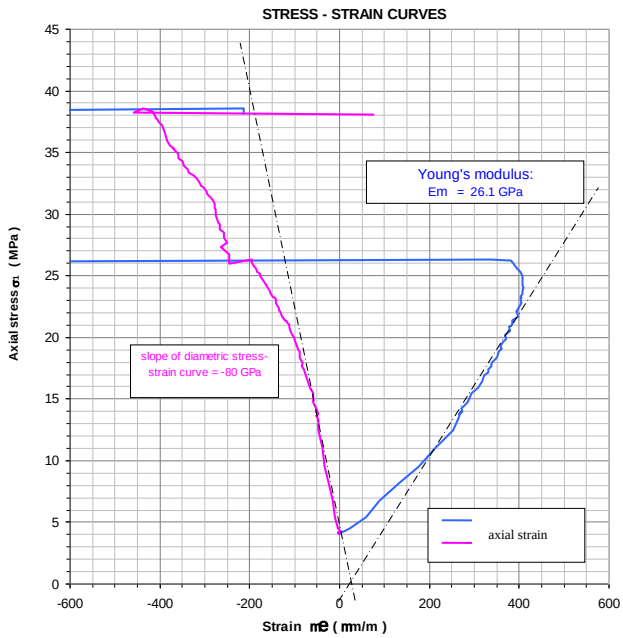
SCAGLIA ROSSA 2 - SPECIMEN AP30
TRIAXIAL COMPRESSIONE TEST s_3 = 5 MPa



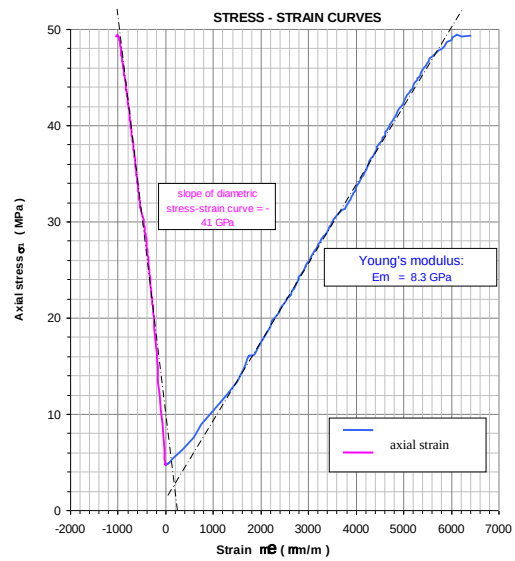
SCAGLIA ROSSA 2 - SPECIMEN AP29
UNIAXIAL COMPRESSION TEST



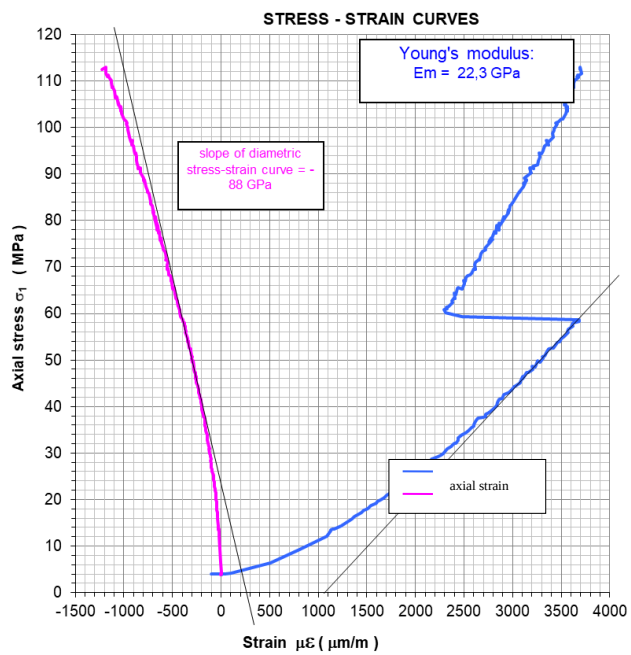
ANDESITE - SPECIMEN VP15
UNIAXIAL COMPRESSION TEST



RHYOLITE - SPECIMEN VP6
UNIAXIAL COMPRESSION TEST

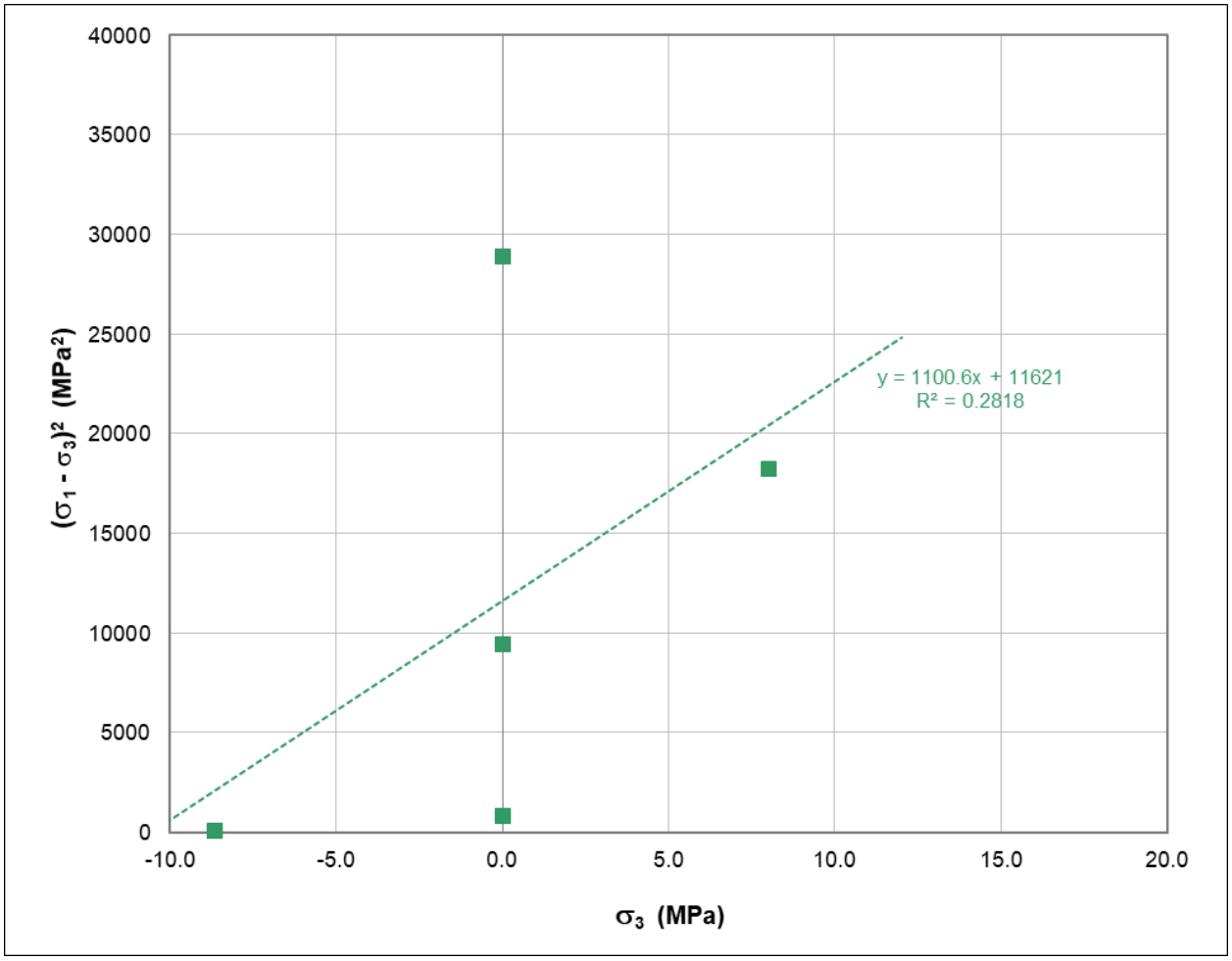


PERLITE - SPECIMEN AP17
UNIAXIAL COMPRESSION TEST

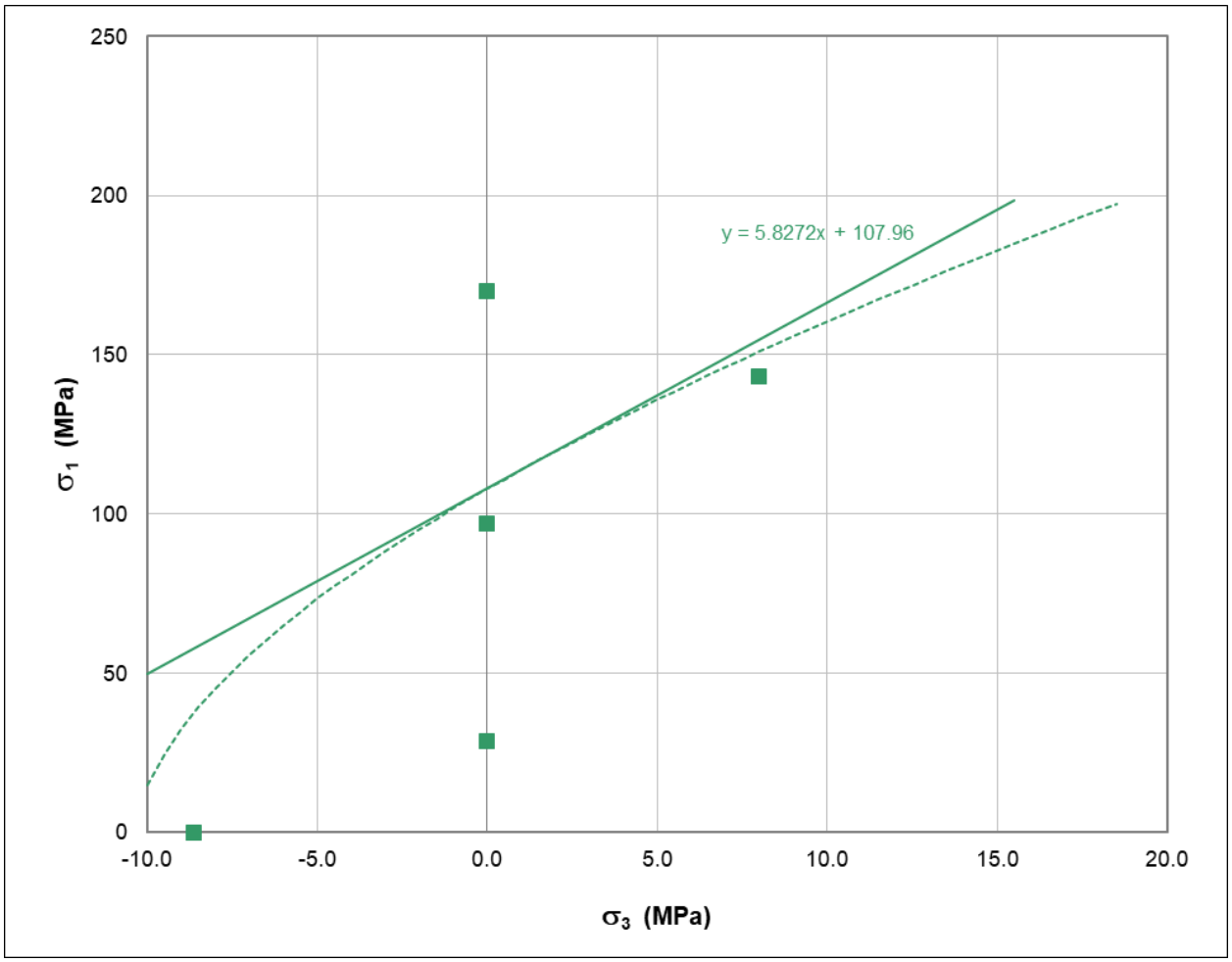


1.2 Failure envelopes

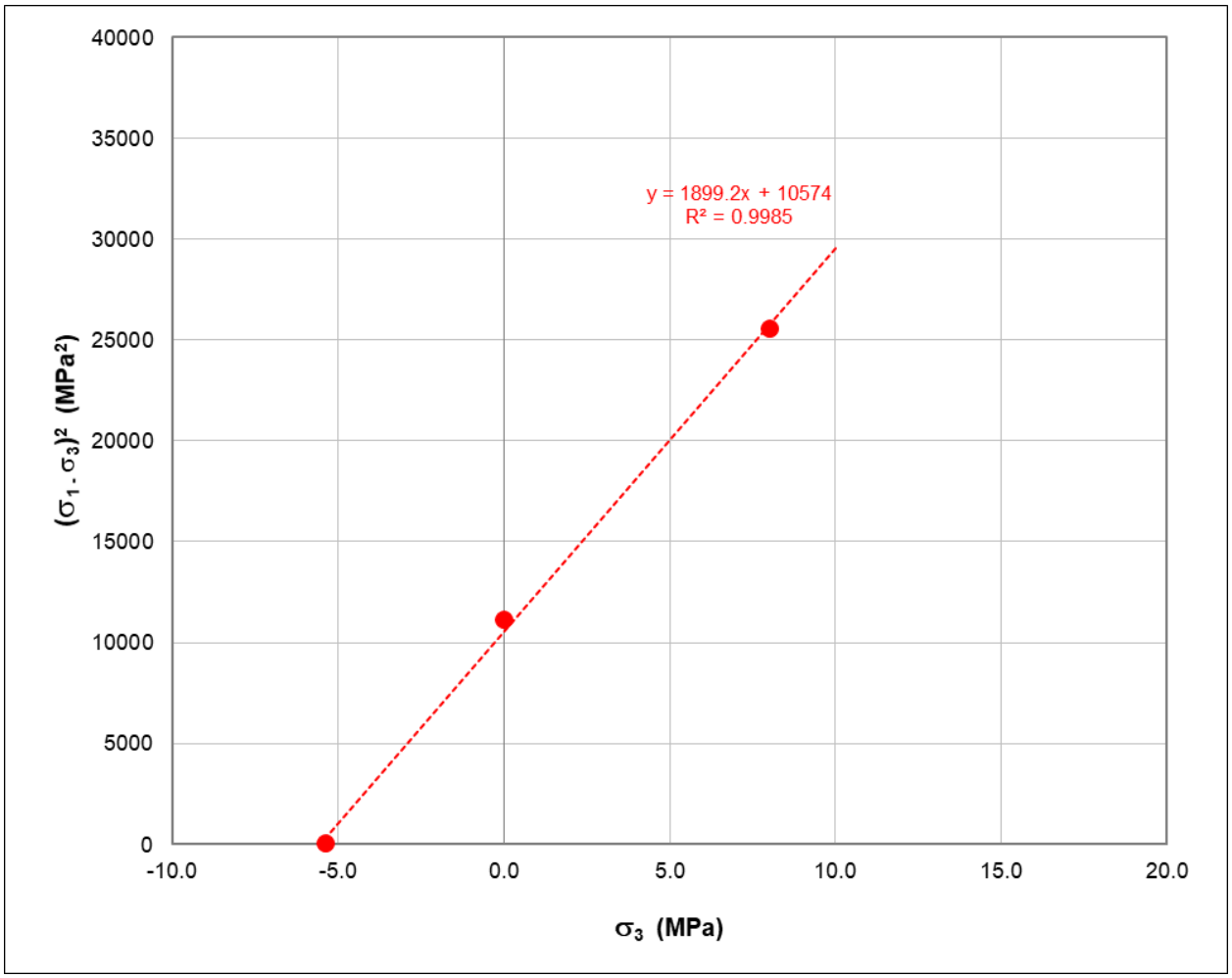
Hoek - Brown failure criterion						
SAMPLE	σ_3 MPa	$(\sigma_1-\sigma_3)^2$ MPa^2	σ_{ci}^2 MPa^2	σ_{ci} MPa	$m_i\,\sigma_{ci}$ MPa^2	m_i -
MAIOLICA			11620.54	**107.80**	1100.6	**10.2**
VP10	0.0	823.69				
T13A - A	8.0	18225				
T13A - B	0.0	9409				
T14A	0.0	28866.01				
VP23-VP24-VP25-VP26 (average)	-8.6	74.6496				



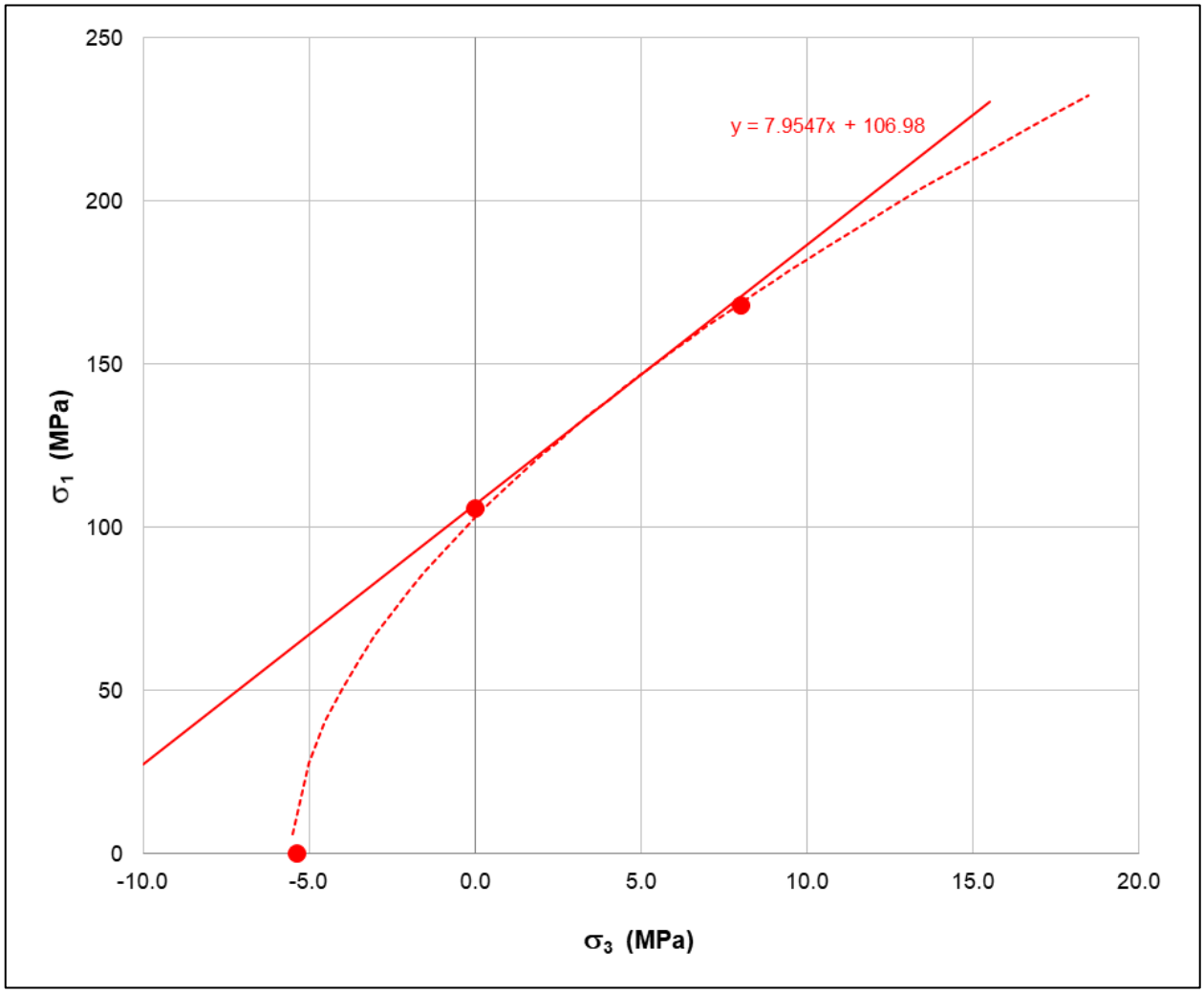
Mohr - Coulomb failure criterion						
SAMPLE	σ_3 MPa	σ_1 MPa	m -	$b = \sigma_c$ MPa	ϕ gradi	c MPa
MAIOLICA			5.83	107.96	**45.0**	**22.4**
VP10	0.0	28.7				
T13A - A	8.0	143				
T13A - B	0.0	97				
T14A	0.0	169.9				
VP23-VP24-VP25-VP26 (average)	-8.6	0				
Assumed value of σ_3 for the calculation of Mohr-Coulomb parameters:			**1.0**		**MPa**	



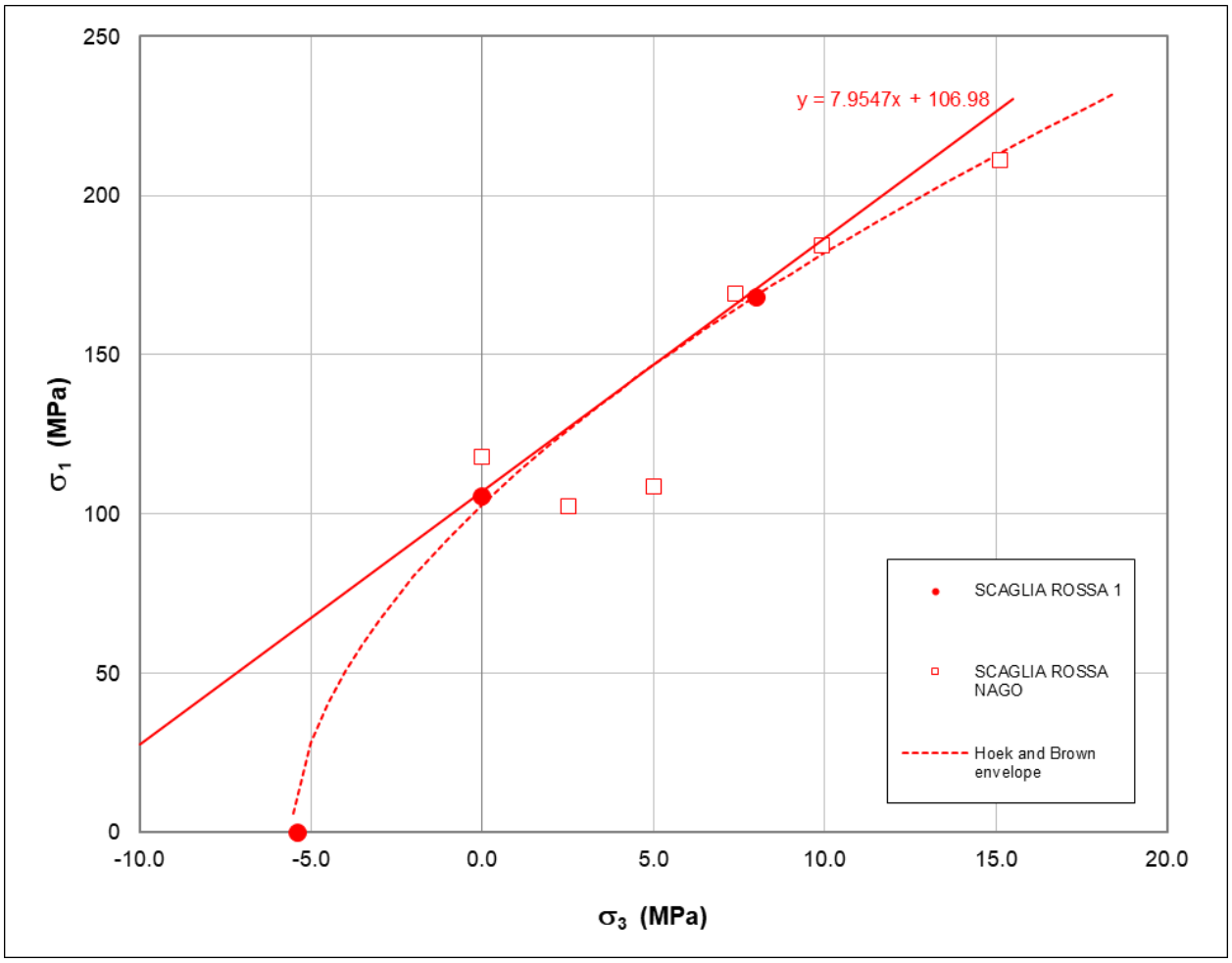
Hoek - Brown failure criterion						
SAMPLE	σ_3 MPa	$(\sigma_1-\sigma_3)^2$ MPa^2	σ_{ci}^2 MPa^2	σ_{ci} MPa	$m_i\,\sigma_{ci}$ MPa^2	m_i -
SCAGLIA ROSSA			10574.45	**102.83**	1899.2	**18.5**
AP20	0.0	11151.36				
T4A	8.0	25536.04				
T4A-T4B-AP28-AP32 (average)	-5.4	28.847641				



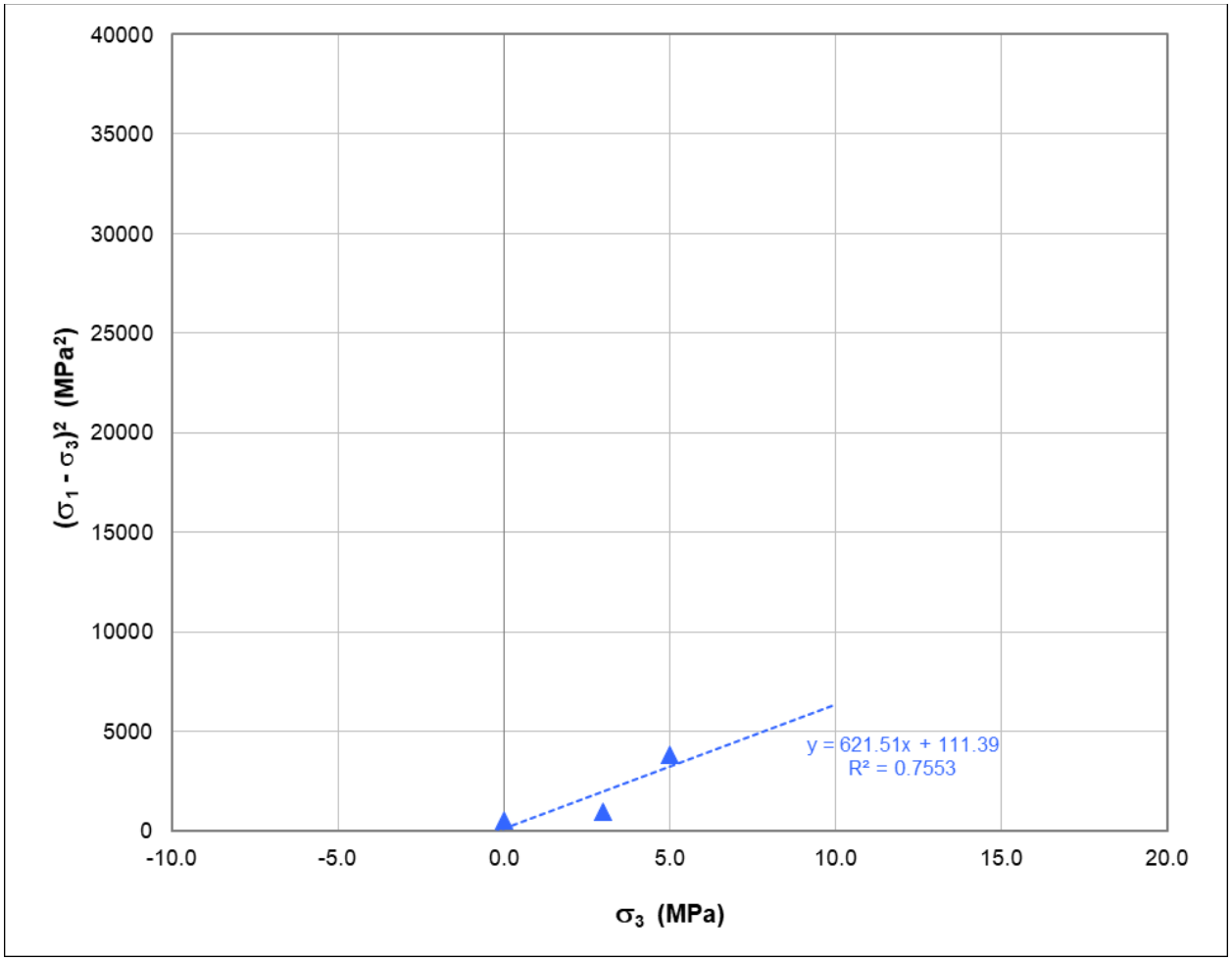
Mohr - Coulomb failure criterion						
SAMPLE	σ_3 MPa	σ_1 MPa	m -	$b = \sigma_c$ MPa	ϕ gradi	c MPa
SCAGLIA ROSSA			7.95	106.98	**51.0**	**19.0**
AP20	0.0	105.6				
T4A	8.0	167.8				
T4A-T4B-AP28-AP32 (average)	-5.4	0				
Assumed value of σ_3 for the calculation of Mohr-Coulomb parameters:	**4.0**			**MPa**		



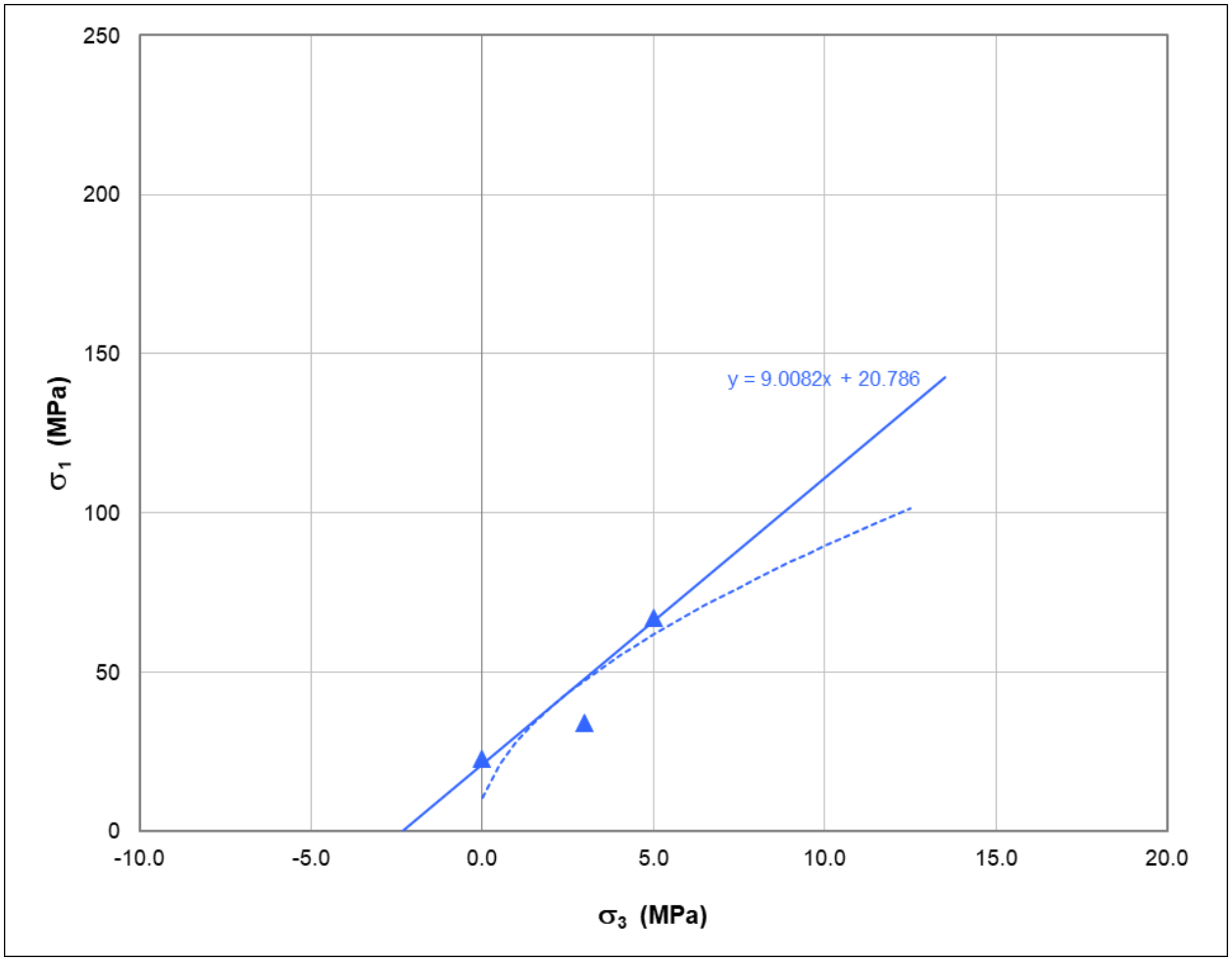
Comparison with Scaglia Rossa of Nago:



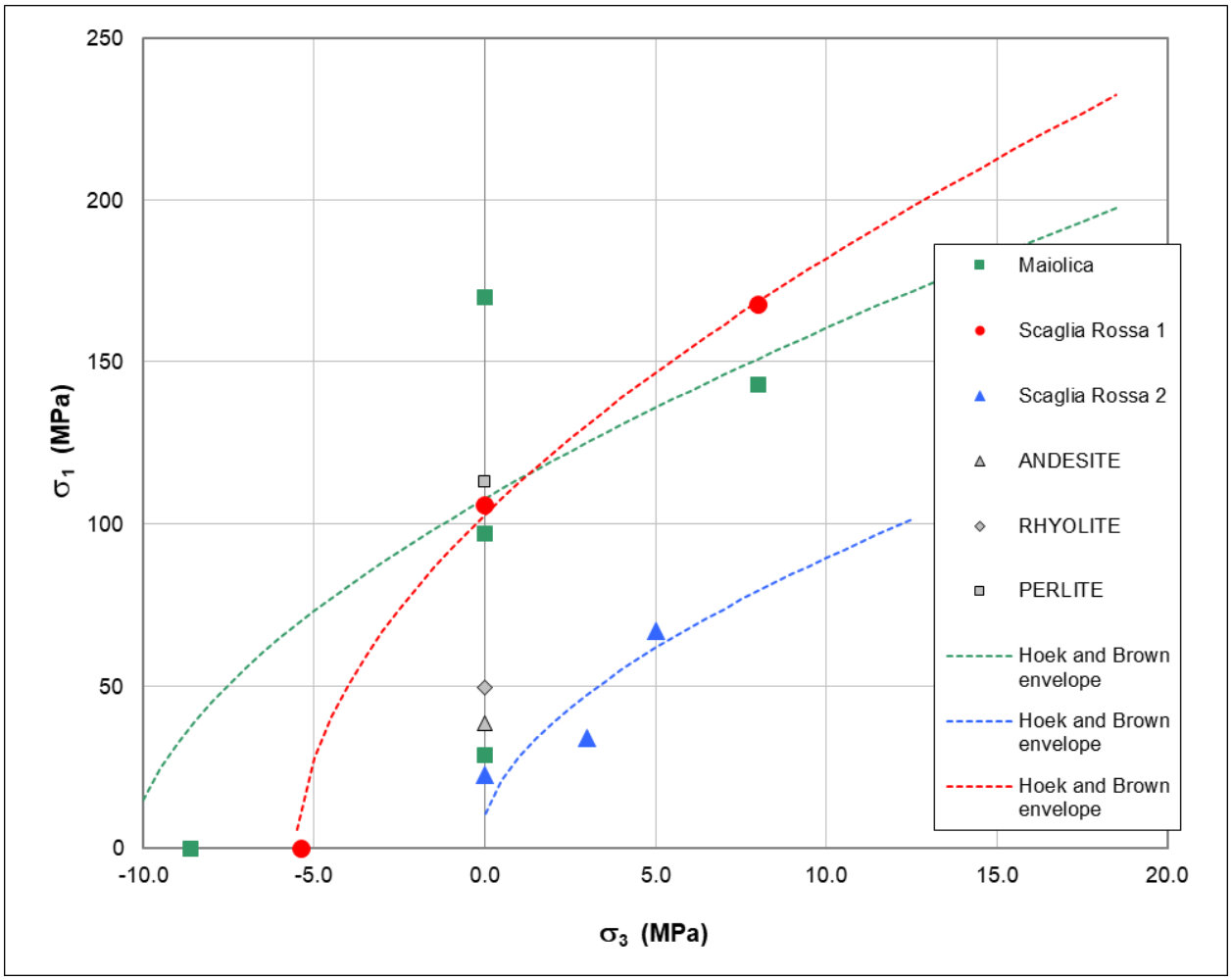
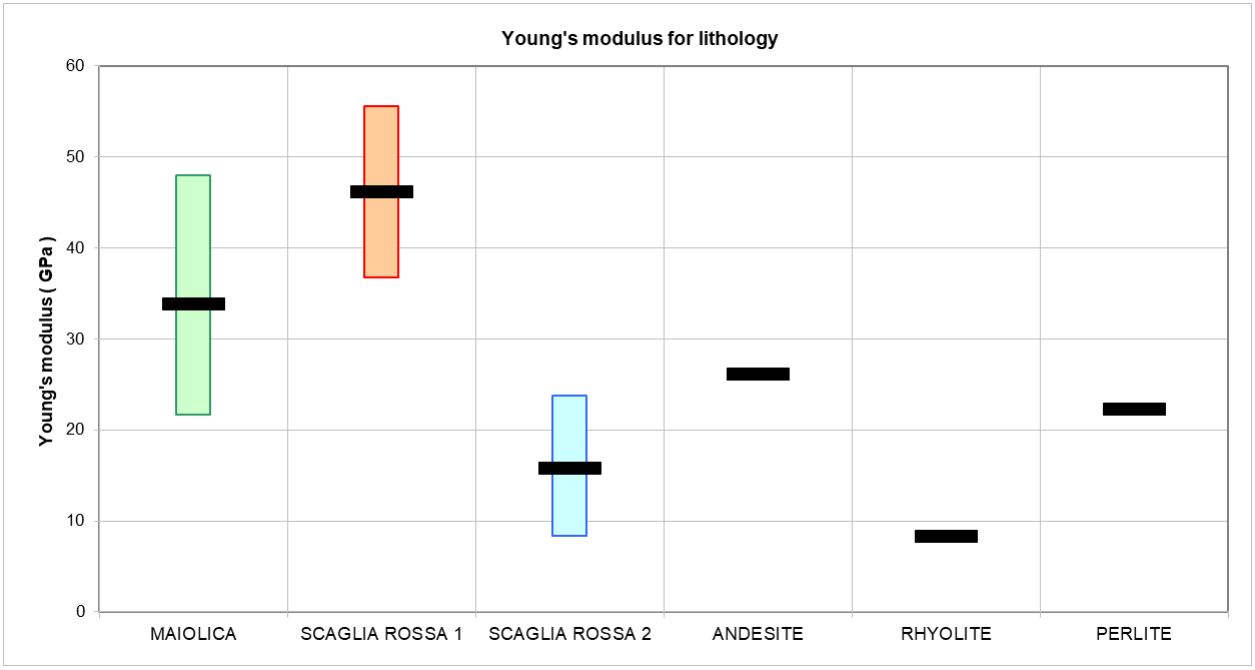
Hoek - Brown failure criterion						
SAMPLE	σ_3 MPa	$(\sigma_1-\sigma_3)^2$ MPa^2	σ_{ci}^2 MPa^2	σ_{ci} MPa	$m_i\,\sigma_{ci}$ MPa^2	m_i -
SCAGLIA ROSSA 2			111.39	**10.55**	621.5	**58.9**
AP29	0.0	519.84				
VP18	3.0	954.81				
AP30	5.0	3831.61				



Mohr - Coulomb failure criterion						
SAMPLE	σ_3 MPa	σ_1 MPa	m -	$b = \sigma_c$ MPa	ϕ gradi	c MPa
SCAGLIA ROSSA 2			9.01	20.79	**53.1**	**3.5**
AP29	0.0	22.8				
VP18	3.0	33.9				
AP30	5.0	66.9				
Assumed value of s_3 for the calculation of Mohr-Coulomb parameters:				**2.0**	**MPa**	



Comparison amongst the different lithologies (summary):



1.3 Young's modulus average for the different lithologies