

CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS (NOTES omitted)

INSTRUMENTS

G01 MEASURING; TESTING (NOTES omitted)

G01V GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (means for indicating the location of accidentally buried, e.g. snow-buried persons [A63B 29/02](#))

NOTES

1. This subclass covers radar, sonar, lidar or analogous systems specifically designed for geophysical use. Radar, sonar, lidar or analogous systems, or details of such systems, if of a general interest, are also classified in subclass [G01S](#).
2. In this subclass, the following term is used with the meaning indicated:
 - "tags" means arrangements cooperating with a detecting field, e.g. near field, and designed to produce a specific detectable effect; "tags" also means active markers capable of generating a detectable field.
3. In this subclass, the geophysical methods apply both to the earth and to other celestial objects, e.g. planets.
4. Attention is drawn to the Notes following the title of class [G01](#).

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
[G01V 3/11](#) covered by [G01V 3/101](#), [G01V 3/104](#)
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00	Seismology; Seismic or acoustic prospecting or detecting	1/09	. . . Transporting arrangements, e.g. on vehicles (G01V 1/38 takes precedence)
	<u>NOTE</u>	1/104	. . using explosive charges (G01V 1/157 takes precedence)
	Groups G01V 1/44 - G01V 1/52 take precedence over groups G01V 1/001 - G01V 1/393 G01V 1/42	1/108	. . . by deforming or displacing surfaces of enclosures
1/001	. {Acoustic presence detection (measurement of sonic vibrations G01H ; alarm systems G08B)}	1/112	. . . . for use on the surface of the earth
1/003	. {Seismic data acquisition in general, e.g. survey design (G01V 1/3808 , G01V 1/42 takes precedence)}	1/116	. . . where pressurised combustion gases escape from the generator in a pulsating manner, e.g. for generating bursts
1/005	. . {with exploration systems emitting special signals, e.g. frequency swept signals, pulse sequences or slip sweep arrangements}	1/13	. . . Arrangements or disposition of charges to produce a desired pattern in space or time
1/006	. . {generating single signals by using more than one generator, e.g. beam steering or focussing arrays (G01V 1/13 , G01V 1/3861 takes precedence)}	1/133	. . using fluidic driving means, e.g. highly pressurised fluids; {using implosion} (G01V 1/104 takes precedence)
1/008	. {Earthquake measurement or prediction (event detection for microseismic events G01V 1/288)}	1/135	. . . by deforming or displacing surfaces of enclosures {, e.g. by hydraulically driven vibroseis™}
1/02	. Generating seismic energy { (G01V 1/003 takes precedence)}	1/137	. . . which fluid escapes from the generator in a pulsating manner, e.g. for generating bursts {, airguns}
1/04	. . Details	1/143	. . using mechanical driving means {, e.g. motor driven shaft} (G01V 1/104 , G01V 1/133 take precedence)
1/047	. . . Arrangements for coupling the generator to the ground	1/145	. . . by deforming or displacing surfaces {, e.g. by mechanically driven vibroseis™}
1/0475	. . . . {for controlling "Ground Force"}	1/147	. . . using impact of dropping masses
1/053	. . . . for generating transverse waves	1/153	. . . using rotary unbalanced masses
1/06	. . . Ignition devices (G01V 1/393 takes precedence)	1/155	. . . using reciprocating masses
1/08	. . . . involving time-delay devices	1/157	. . using spark discharges; using exploding wires

1/159	. . {using piezoelectric or magnetostrictive driving means (generating mechanical vibrations by using piezoelectric or magnetostrictive effect in general, B06B 1/06 , B06B 1/08)}	1/301	. . . {for determining seismic cross-sections or geostructures}
1/16	. Receiving elements for seismic signals; Arrangements or adaptations of receiving elements	1/302	. . . . {in 3D data cubes}
1/162	. . {Details}	1/303	. . . {for determining velocity profiles or travel times}
1/164	. . . {Circuits therefore}	1/305	. . . . {Travel times}
1/166	. . . {Arrangements for coupling receivers to the ground}	1/306	. . . {for determining physical properties of the subsurface, e.g. impedance, porosity or attenuation profiles}
1/168	. . {Deployment of receiver elements (G01V 1/3843 takes precedence)}	1/307	. . . {for determining seismic attributes, e.g. amplitude, instantaneous phase or frequency, reflection strength or polarity}
1/18	. . Receiving elements, e.g. seismometer, geophone {or torque detectors, for localised single point measurements}	1/308	. . . {Time lapse or 4D effects, e.g. production related effects to the formation (fluid flow per se E21B 47/00)}
1/181	. . . {Geophones}	1/32	. . Transforming one recording into another {or one representation into another}
1/182	. . . . {with moving coil}	1/325	. . . {Transforming one representation into another}
1/183	. . . . {with moving magnet}	1/34	. . Displaying seismic recordings {or visualisation of seismic data or attributes}
1/184	. . . . {Multi-component geophones}	1/345	. . . {Visualisation of seismic data or attributes, e.g. in 3D cubes}
1/185	. . . . {with adaptable orientation, e.g. gimbaled}	1/36	. . Effecting static or dynamic corrections on records, e.g. correcting spread; Correlating seismic signals; Eliminating effects of unwanted energy
1/186	. . . {Hydrophones}	1/362	. . . {Effecting static or dynamic corrections; Stacking}
1/187	. . . . {Direction-sensitive hydrophones}	1/364	. . . {Seismic filtering (G01V 1/37 takes precedence)}
1/188	. . . . {with pressure compensating means}	1/366	. . . . {by correlation of seismic signals}
1/189	. . . {Combinations of different types of receiving elements}	1/368	. . . . {Inverse filtering}
1/20	. . Arrangements of receiving elements, e.g. geophone pattern	1/37	. . . specially adapted for seismic systems using continuous agitation of the ground {, e.g. using pulse compression of frequency swept signals for enhancement of received signals}
1/201	. . . {Constructional details of seismic cables, e.g. streamers (integrated optoseismic systems G01V 1/226 ; line connectors in general H01R , transducer mountings in general G10K 11/004)}	1/375	. . . . {Correlating received seismic signals with the emitted source signal}
1/202	. . . . {Connectors, e.g. for force, signal or power}	1/38	. specially adapted for water-covered areas (G01V 1/28 , { G01V 1/42 take precedence})
2001/204	. . . . {Reinforcements, e.g. by tensioning cables}	1/3808	. . {Seismic data acquisition, e.g. survey design (in general G01V 1/003)}
2001/205	. . . . {Internal damping}	1/3817	. . {Positioning of seismic devices}
2001/207	. . . . {Buoyancy}	1/3826	. . . {dynamic steering, e.g. by paravanes or birds}
1/208	. . . . {having a continuous structure (detecting traffic G08G , transducers in general G10K)}	1/3835	. . . {measuring position, e.g. by GPS or acoustically}
1/22	. Transmitting seismic signals to recording or processing apparatus	1/3843	. . {Deployment of seismic devices, e.g. of streamers (equipment for marine deployment in general B63B)}
1/223	. . {Radioseismic systems}	1/3852	. . . {to the seabed}
1/226	. . {Optoseismic systems}	1/3861	. . {control of source arrays, e.g. for far field control}
1/24	. Recording seismic data	1/387	. . Reducing secondary bubble pulse, i.e. reducing the detected signals resulting from the generation and release of gas bubbles after the primary explosion
1/242	. . {Seismographs}	1/393	. . Means for loading explosive underwater charges, e.g. combined with ignition devices
1/245	. . {Amplitude control for seismic recording (control of amplification in general H03G)}	1/40	. specially adapted for well-logging
1/247	. . {Digital recording of seismic data, e.g. in acquisition units or nodes}	1/42	. . using generators in one well and receivers elsewhere or vice versa (G01V 1/52 takes precedence)
1/26	. . Reference-signal-transmitting devices, e.g. indicating moment of firing of shot	1/44	. . using generators and receivers in the same well (G01V 1/52 takes precedence)
1/28	. Processing seismic data, e.g. analysis, for interpretation, for correction (G01V 1/48 takes precedence)		
1/282	. . {Application of seismic models, synthetic seismograms}		
1/284	. . {Application of the shear wave component and/or several components of the seismic signal}		
1/286	. . . {Mode conversion}		
1/288	. . {Event detection in seismic signals, e.g. microseismics (earthquakes G01V 1/008 ; G01V 1/36 takes precedence)}		
1/30	. . Analysis (G01V 1/50 takes precedence)		

1/46	. . . Data acquisition	3/18	. specially adapted for well-logging
1/48	. . . Processing data	3/20	. . operating with propagation of electric current
1/50	. . . . Analysing data	3/22	. . . using dc
1/52	. . Structural details	3/24	. . . using ac
1/523	. . . {Damping devices}	3/26	. . operating with magnetic or electric fields produced or modified either by the surrounding earth formation or by the detecting device (with electromagnetic waves G01V 3/30)
2001/526	. . . {Mounting of transducers}	3/265	. . . {Operating with fields produced by spontaneous potentials, e.g. electrochemicals or produced by telluric currents}
3/00	Electric or magnetic prospecting or detecting; Measuring magnetic field characteristics of the earth, e.g. declination, deviation	3/28	. . . using induction coils
3/02	. operating with propagation of electric current	3/30	. . operating with electromagnetic waves
3/04	. . using dc	3/32	. . operating with electron or nuclear magnetic resonance
3/06	. . using ac	3/34	. . Transmitting data to recording or processing apparatus; Recording data
3/08	. operating with magnetic or electric fields produced or modified by objects or geological structures or by detecting devices (with electromagnetic waves G01V 3/12)	3/36	. Recording data (G01V 3/34 takes precedence)
3/081	. . {the magnetic field is produced by the objects or geological structures (characterised by the method of magnetic field measurement G01R 33/00)}	3/38	. Processing data, e.g. for analysis, for interpretation, for correction
3/082	. . {operating with fields produced by spontaneous potentials, e.g. electrochemical or produced by telluric currents (G01V 3/26 takes precedence)}	3/40	. specially adapted for measuring magnetic field characteristics of the earth
3/083	. . {Controlled source electromagnetic [CSEM] surveying}	5/00	Prospecting or detecting by the use of nuclear radiation, e.g. of natural or induced radioactivity
2003/084	. . . {Sources}	5/0008	. {Detecting hidden objects, e.g. weapons, explosives (sorting of materials or articles according to radioactive properties B07C 5/342; investigating or analysing materials by the use of wave or particle radiation G01N 23/00)}
2003/085	. . . {Receivers}	5/0016	. . {Active interrogation, i.e. using an external radiation source, e.g. using pulsed, continuous or cosmic rays}
2003/086	. . . {Processing}	5/0025	. . . {Measuring scattered radiation}
3/087	. . {the earth magnetic field being modified by the objects or geological structures}	5/0033	. . . {Mixed interrogation beams, e.g. using more than one type of radiation beam}
3/088	. . {operating with electric fields (G01V 3/082 takes precedence)}	5/0041	. . . {Multiple energy techniques using one type of radiation, e.g. X-rays of different energies (multi-beam applications, e.g. X-rays and neutrons G01V 5/0033; spectroscopic applications G01V 5/0016)}
3/10	. . using induction coils	5/005	. . . {using Tomography, e.g. CT or SPECT (detector details in CT applications G01T 1/2985)}
3/101	. . . {by measuring the impedance of the search coil; by measuring features of a resonant circuit comprising the search coil (measuring impedance or characteristics derived therefrom G01R 27/00, e.g. quality factor G01R 27/26)}	5/0058	. . . {using stereoscopic means}
3/102	. . . . {by measuring amplitude}	5/0066	. . . {having relative motion between the source, detector and object other than by conveyor (G01V 5/005 takes precedence)}
3/104	. . . {using several coupled or uncoupled coils (G01V 3/101 takes precedence)}	5/0069	. . . {Measuring induced radiation, e.g. thermal neutron activation analysis (investigating or analysing materials by the use of neutrons G01N 23/222)}
3/105	. . . . {forming directly coupled primary and secondary coils or loops}	5/0075	. . {Passive interrogation (for hand, feet or portals G01T 1/167; for contaminated surface areas G01T 1/169)}
3/107	. . . . . {using compensating coil or loop arrangements}	5/0083	. . {utilizing a network, e.g. a remote expert, accessing remote data or the like}
3/108	. . . . {the emitter and the receiver coils or loops being uncoupled by positioning them perpendicularly to each other}	5/0091	. . {detecting special nuclear material [SNM], e.g. Uranium-235, Uranium-233 or Plutonium-239}
3/12	. operating with electromagnetic waves {(operating with millimetre waves G01V 8/005)}	5/02	. specially adapted for surface logging, e.g. from aircraft
3/14	. operating with electron or nuclear magnetic resonance	5/025	. . {specially adapted for use from aircraft}
3/15	. specially adapted for use during transport, e.g. by a person, vehicle or boat	5/04	. specially adapted for well-logging
3/16	. . specially adapted for use from aircraft (G01V 3/165 - G01V 3/175 take precedence)	5/045	. . {Transmitting data to recording or processing apparatus; Recording data}
3/165	. . operating with magnetic or electric fields produced or modified by the object or by the detecting device (with electromagnetic waves G01V 3/17)		
3/17	. . operating with electromagnetic waves {(operating with millimetre waves G01V 8/005)}		
3/175	. . operating with electron or nuclear magnetic resonance		

- 5/06 . . for detecting naturally radioactive minerals
- 5/08 . . using primary nuclear radiation sources or X-rays
{(, e.g. for inducing radioactivity; investigating or analysing materials by the use of wave or particle radiation, e.g. X-rays, neutrons [G01N 23/00](#))}
- 5/085 . . . {using another radioactive source}
- 5/10 . . . using neutron sources {(neutron generating tubes [H05H 5/00](#); neutron sources using isotopes [G21G 4/00](#))}
- 5/101 {and detecting the secondary Y-rays produced in the surrounding layers of the bore hole}
- 5/102 {the neutron source being of the pulsed type}
- 5/104 {and detecting secondary Y-rays as well as reflected or back-scattered neutrons}
- 5/105 {the neutron source being of the pulsed type}
- 5/107 {and detecting reflected or back-scattered neutrons}
- 5/108 {the neutron source being of the pulsed type}
- 5/12 . . . using gamma or X-ray sources {(gamma sources using isotopes [G21G 4/00](#); X-ray tubes [H01J 35/00](#))}
- 5/125 {and detecting the secondary gamma- or X-rays in different places along the bore hole}
- 5/14 . . . using a combination of several sources, e.g. a neutron and a gamma source
- 5/145 {using a neutron source combined with a gamma- or X-ray source}
- 7/00 Measuring gravitational fields or waves; Gravimetric prospecting or detecting**
- 7/005 . {using a resonating body or device, e.g. string ([G01V 7/08](#) - [G01V 7/12](#) take precedence; measuring resonant frequency of mechanical vibrations [G01H 13/00](#); measuring frequency [per se](#) [G01R 23/00](#))}
- 7/02 . Details
- 7/04 . . Electric, photoelectric, or magnetic indicating or recording means
- 7/06 . . Analysis or interpretation of gravimetric records
- 7/08 . using balances
- 7/10 . . using torsion balances, e.g. Eötvös balance
- 7/12 . using pendulums
- 7/14 . using free-fall time
- 7/16 . specially adapted for use on moving platforms, e.g. ship, aircraft
- 8/00 Prospecting or detecting by optical means**
- NOTE**
This group covers the use of {millimetre waves,} infra-red, visible or ultra-violet light.
- 8/005 . {operating with millimetre waves, e.g. measuring the black losey radiation}
- 8/02 . Prospecting
- 8/10 . Detecting, e.g. by using light barriers ([by reflection from the object](#) [G01S 17/00](#))
- 8/12 . . using one transmitter and one receiver
- 8/14 . . . using reflectors
- 8/16 . . . using optical fibres
- 8/18 . . . using mechanical scanning systems
- 8/20 . . using multiple transmitters or receivers
- 8/22 . . . using reflectors
- 8/24 . . . using optical fibres
- 8/26 . . . using mechanical scanning systems
- 9/00 Prospecting or detecting by methods not provided for in groups [G01V 1/00](#) - [G01V 8/00](#)**
- 9/002 . {using fields or radiation detectable only by persons susceptible therefor, e.g. radio-esthesia, dowsing}
- 9/005 . {by thermal methods, e.g. after generation of heat by chemical reactions}
- 9/007 . {by detecting gases or particles representative of underground layers at or near the surface ([analysing earth materials](#) [G01N 33/24](#); [analysing gases per se](#) [G01N](#))}
- 9/02 . Determining existence or flow of underground water
- 11/00 Prospecting or detecting by methods combining techniques covered by two or more of main groups [G01V 1/00](#) - [G01V 9/00](#)**
- 11/002 . {Details, e.g. power supply systems for logging instruments, transmitting or recording data, specially adapted for well logging, also if the prospecting method is irrelevant (means for transmitting well survey signals [E21B 47/12](#); signal transmission systems in general [G08C](#); transmission in general [H04B](#))}
- 11/005 . . {Devices for positioning logging sondes with respect to the borehole wall (centralising devices for drilling rods or pipes [E21B 17/10](#); setting or locking tools in boreholes [E21B 23/00](#); locating objects in boreholes [E21B 47/09](#))}
- 11/007 . {using the seismo-electric effect}
- 13/00 Manufacturing, calibrating, cleaning, or repairing instruments or devices covered by groups [G01V 1/00](#) - [G01V 11/00](#)**
- 15/00 Tags attached to, or associated with, an object, in order to enable detection of the object ([record carriers for use with machines having a detectable tag or marker](#) [G06K 19/00](#))**
- 99/00 Subject matter not provided for in other groups of this subclass**
- 99/005 . {Geomodels or geomodelling, not related to particular measurements}
- 2200/00 Details of seismic or acoustic prospecting or detecting in general**
- 2200/10 . Miscellaneous details
- 2200/12 . . Clock synchronization-related issues
- 2200/14 . . Quality control
- 2200/16 . . Measure-while-drilling or logging-while-drilling
- 2210/00 Details of seismic processing or analysis**
- 2210/10 . Aspects of acoustic signal generation or detection
- 2210/12 . . Signal generation
- 2210/121 . . . Active source
- 2210/1212 Shot
- 2210/1214 Continuous
- 2210/1216 Drilling-related
- 2210/123 . . . Passive source, e.g. microseismics
- 2210/1232 Earthquakes
- 2210/1234 Hydrocarbon reservoir, e.g. spontaneous or induced fracturing

2210/1236	. . . . Acoustic daylight, e.g. cultural noise	2210/47	. . Slowness, e.g. tau-pi
2210/125	. . . Virtual source	2210/48	. . Other transforms
2210/127	. . . Cooperating multiple sources	2210/50	. Corrections or adjustments related to wave propagation (noise handling G01V 2210/30)
2210/129	. . . Source location	2210/51	. . Migration
2210/1291	. . . . Air	2210/512	. . . Pre-stack
2210/1293	. . . . Sea	2210/514	. . . Post-stack
2210/1295	. . . . Land surface	2210/52	. . Move-out correction
2210/1297	. . . . Sea bed	2210/522	. . . Dip move-out [DMO]
2210/1299	. . . . Subsurface, e.g. in borehole or below weathering layer or mud line	2210/53	. . Statics correction, e.g. weathering layer or transformation to a datum
2210/14	. . Signal detection	2210/532	. . . Dynamic changes in statics, e.g. sea waves or tidal influences
2210/142	. . . Receiver location	2210/54	. . Borehole-related corrections
2210/1421	. . . . Air	2210/542	. . . Casing
2210/1423	. . . . Sea	2210/544	. . . Invasion zone
2210/1425	. . . . Land surface	2210/55	. . Array focusing; Phased arrays
2210/1427	. . . . Sea bed	2210/56	. . De-ghosting; Reverberation compensation
2210/1429	. . . . Subsurface, e.g. in borehole or below weathering layer or mud line	2210/57	. . Trace interpolation or extrapolation, e.g. for virtual receiver; Anti-aliasing for missing receivers
2210/144	. . . with functionally associated receivers, e.g. hydrophone and geophone pairs	2210/58	. . Media-related
2210/16	. . Survey configurations	2210/582	. . . Dispersion
2210/161	. . . Vertical seismic profiling [VSP]	2210/584	. . . Attenuation
2210/163	. . . Cross-well	2210/586	. . . Anisotropic media
2210/165	. . . Wide azimuth	2210/588	. . . Non-linear media
2210/167	. . . Very long offset	2210/59	. . Other corrections
2210/169	. . . Sparse arrays	2210/60	. Analysis
2210/20	. Trace signal pre-filtering to select, remove or transform specific events or signal components, i.e. trace-in/trace-out (removing noise G01V 2210/32)	2210/61	. . Analysis by combining or comparing a seismic data set with other data
2210/21	. . Frequency-domain filtering, e.g. band pass	2210/612	. . . Previously recorded data, e.g. time-lapse or 4D
2210/22	. . Time-domain filtering	2210/6122	. . . . Tracking reservoir changes over time, e.g. due to production
2210/23	. . Wavelet filtering	2210/6124	. . . . . Subsidence, i.e. upwards or downwards
2210/24	. . Multi-trace filtering	2210/614	. . . Synthetically generated data
2210/242	. . . F-k filtering, e.g. ground roll	2210/616	. . . Data from specific type of measurement
2210/244	. . . Radon transform	2210/6161	. . . . Seismic or acoustic, e.g. land or sea measurements
2210/25	. . Transform filter for merging or comparing traces from different surveys	2210/6163	. . . . . Electromagnetic
2210/26	. . Modulation or demodulation, e.g. for continuous sources	2210/6165	. . . . . Gravitational
2210/27	. . Other pre-filtering	2210/6167	. . . . . Nuclear
2210/30	. Noise handling (trace signal pre-filtering G01V 2210/20)	2210/6169	. . . . . using well-logging
2210/32	. . Noise reduction	2210/62	. . Physical property of subsurface
2210/322	. . . Trace stacking	2210/622	. . . Velocity, density or impedance
2210/324	. . . Filtering	2210/6222	. . . . Velocity; travel time
2210/3242	. . . . Flow noise	2210/6224	. . . . . Density
2210/3244	. . . . Cultural noise	2210/6226	. . . . . Impedance
2210/3246	. . . . Coherent noise, e.g. spatially coherent or predictable	2210/624	. . . Reservoir parameters
2210/3248	. . . . Incoherent noise, e.g. white noise	2210/6242	. . . . . Elastic parameters, e.g. Young, Lamé or Poisson
2210/34	. . Noise estimation (quality control G01V 2200/14)	2210/6244	. . . . . Porosity
2210/36	. . Noise recycling, i.e. retrieving non-seismic information from noise	2210/6246	. . . . . Permeability
2210/38	. . Noise characterisation or classification	2210/6248	. . . . . Pore pressure
2210/40	. Transforming data representation (for pre-filtering purposes G01V 2210/20)	2210/626	. . . with anisotropy
2210/41	. . Arrival times, e.g. of P or S wave or first break	2210/63	. . Seismic attributes, e.g. amplitude, polarity, instant phase
2210/42	. . Waveform, i.e. using raw or pre-filtered trace data	2210/632	. . . Amplitude variation versus offset or angle of incidence [AVA, AVO, AVI]
2210/43	. . Spectral	2210/64	. . Geostructures, e.g. in 3D data cubes
2210/44	. . F-k domain	2210/641	. . . Continuity of geobodies
2210/45	. . F-x or F-xy domain	2210/642	. . . Faults
2210/46	. . Radon transform	2210/643	. . . Horizon tracking

2210/644	. . .	Connectivity, e.g. for fluid movement
2210/645	. . .	Fluid contacts
2210/646	. . .	Fractures
2210/647	. . .	Gas hydrates
2210/65	. .	Source localisation, e.g. faults, hypocenters or reservoirs
2210/66	. .	Subsurface modeling
2210/661	. . .	Model from sedimentation process modeling, e.g. from first principles
2210/663	. . .	Modeling production-induced effects
2210/665	. . .	using geostatistical modeling
2210/6652	. . . .	Kriging
2210/667	. . .	Determining confidence or uncertainty in parameters
2210/67	. .	Wave propagation modeling
2210/671	. . .	Raytracing
2210/673	. . .	Finite-element; Finite-difference
2210/675	. . .	Wave equation; Green's functions
2210/677	. . .	Spectral; Pseudo-spectral
2210/679	. . .	Reverse-time modeling or coalescence modelling, i.e. starting from receivers
2210/70	. .	Other details related to processing
2210/72	. .	Real-time processing
2210/74	. .	Visualisation of seismic data