of convection and has the lowest possible dimensionality, i.e. three, for chaotic differential systems. Unfortunately, this success may have lead to an awkward tendency to reduce complex systems to their low dimensional caricatures including the corresponding predictibility limits. This tendency may have been reinforced by the apparent success of the rather straightforward correlation dimension algorithm to estimate the dimensionality for various complex systems. As a consequence - in spite of observed discrepancies - the existence of characteristic predictability time and a corresponding exponential fall-off of predictability were considered as the universal long-time asymptotic laws. However, for rather well known reasons, the low dimension estimates of geophysical systems turn out to be spurious. It is now rather clear that the chaos of these spatially extended systems, requires approaches dealing with very large number of degrees of freedom and that certain asymptotic behaviors correspond instead to the infinite limit. The modelling of this high number of degreees of freedom liimit can be obtained by an original blending of stochastics and scaling dynamics, e.g. multiplicative cascade processes, more generally with the help of multifractal processes. The latter do not yield characteristic times of predictability: a limited uncertainty on initial and/or boundary conditions on a given range of time and space scales rapidly grows across the scales and yields scaling (i.e. power-law) decays of the predictability, therefore we should be able to predict on the average much better and longer than previously thought. However, intermittency plays a crucial role, as it will be illustrated with the help of multifractal simulations. Decay of predictability is not homogeneous, but occurs by bursts. Some non trivial questions about multifractal prediction are related to it: it is not sufficient, although an improvement in respect to usual methods, to forecast a field with a lower and lower resolution for larger and larger time lag. Indeed, one need to take into account the interactions between the rather predictable large scales with the hihgly impredictible smaller scales. This is particularly indispensable to forecast the extreme events.

URL: http://www.multifractal.jussieu.fr

NG41A-03 0830h

Strategies for the Use of Scaling for Subgrid Parameterizations for Globbal Circulation Models of the Atmosphere

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The problem of parameterization of physical process in large scale numerical models of the atmosphere will be developed first from a formal perspective of specifying sub-grid effects as distributions conditional upon resolved scales of motions. Historically, focus has been concentrated upon models of the 'average' or mean tendencies and the models have been of two classes: subgrid models which depend upon scale similarity and those which are developed from idealized process models. The Smagorinsky eddy diffusion is the most notable use of scale similarity arguments in parameterizations for large scale models. However, for many other sub-grid physical processes little use of scaling structure has been utilized in the development of parameterizations. I will describe some recent efforts and new strategies aimed at moving beyond the use of non-scaling process models for the computation of the subgrid tendencies due to subgrid effects of clouds, cumulus convection, orographic drag and radiation. The major complication in the pure scale similarity approach or the process model approach to parameterization is the spatio-temporal intermittency of meso and micro scale atmospheric motions which must be accounted for.

NG41A-04 0845h INVITED

Airborne Studies of Scale Invariance in the Polar Night Jet Stream

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Airborne observations in both hemispheres of the lower stratospheric polar night jet stream revealed generalized scale invariance. The scaling exponent H_z for wind speed and temperature had systematic correlations with wind shear and temperature gradient respectively, showing persistence across-jet, anti-persistence along-jet and a canonical mean value of $H_z = 5/9$. A passive scalar, nitrous oxide, had $H_z = 0.56$ with s.d. = 0.01, while photochemically active ozone had 0.49 with the same s.d. The intermittency of temperature was 2-3 times larger than that of wind speed or ozone. The analysis appears to provide a natural connection between generalized scale invariance of high resolution observations and traditional large-scale dynamical meteorology.

NG41A-05 0900h INVITED

Mesoscale Variability, Representativeness of Meteorological Observations and Assimilation of Observations into models

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This review is concerned with issues related to the assimilation of meteorological observations into numerical models in the presence of mesoscale variability that may limit the representativeness of the observation on the resolution scale of the model. Models provide an essential tool for synthesizing diverse observations from many sources. They provide us with a means to specify the state of the atmosphere or ocean at any particular time and allow us to forecast the future state of the atmosphere or ocean. Observations assimilated into models may be in situ point measurements, remotely sensed direct measurements such as are provided by wind profilers, or indirect remotely Sensed measurements provided by satellites. While the issues considered in this review are very general, there is a pressing need to assimilate remotely sensed data into models. From developments in data assimilation it is well known that for optimal performance models require information on the error covariance of the parameter being measured. In general, this means information is required on the measurement error of instruments as well as the representativeness of the measurements themselves. The representativeness error is often the dominant component of error covariance. Specification of representativeness error requires knowledge of the variability of the field being measured.This review examines sources of mesoscale atmospheric variability and some means for specifying variability quantitatively.

NG41A-06 0915h INVITED

Long-term correlations in the atmosphere: Testbeds of climate models and novel extreme value statistics

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Temperature records exhibit long-term correlations characterized by a power-law decay of the autocorrelation function, $C(s) \sim s^{-\gamma}$, with γ close to 0.7 for continental stations and γ close to 0.4 for sea surface temperatures. Here we show that these laws present a powerful test bed for the various scenarios of the state-of-the-art climate models and discuss, how the presence of long-term correlations affects the statistics of the return intervals r_q for events above a certain threshold value q. Among others, we show (i) that the distribution of r_q follows a stretched exponential, $\ln P_q(r) \sim -(r/\langle r_q \rangle)^{\gamma}$, and (ii) that the return intervals are also long-term correlated with the exponent γ, yielding clustering of both small and large intervals. We present evidence, that both features can be seen in long observational and reconstructed records.

NG41A-07 0930h INVITED

Multiscale Structure of the Heliospheric Magnetic Field Strength and Solar Wind Speed: Multifractal Structure and Distribution Functions

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The Sun is surrounded by a region called the 'heliosphere', which has been explored by the Voyager 1 spacecraft to 85 AU and beyond. The heliosphere is filled with magnetic fields and plasmas moving from the Sun toward the interstellar medium at supersonic speeds. The magnetic fields and have plasmas a variety of sources on the Sun and they move with a broad range of speeds, so that they interact as they move away from the Sun. The diversity of the flows and their interactions on a wide range of scales lead to a complex, evolving heliospheric structure. On scales from 1 to 26 days the magnetic field and speed variations can be described by multifractals, power spectra, and probability distribution functions on various scales. The radial evolution of the multi-scale structure of the large-scale fluctuations in the heliosphere can be described and predicted by a deterministic multi-fluid MHD model, with observations at 1 AU as input conditions.

NG41A-08 0945h INVITED

Non-homogeneity in rainfall: some considerations

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The homogeneity of rainfall as working hypothesis has widely adopted in hydrologic science. Non-homogeneity can be safely neglected when, at the relevant scales, it has small effect and the random field may be considered homogeneous; in other circumstances homogeneity and non-homogeneity co-exist within the same data set, at different range of scales (e.g. small-scale non-homogeneity and large-scale homogeneity) or in a more complex way. On the other side, it is accepted that rainfall fields exhibit scale invariance properties over a wide range of spatial and temporal windows. This aspect of rainfall is non consistent with its non-homogeneity; namely when the scaling properties are assessed over a range of scales where the homogeneity is a poor approximation, wrong conclusions are drawn. On this route, the presence of non-homogeneity in rainfall is detected through some statistical tests. It is showed how neglecting the non-homogeneity behaviour, some wrong conclusions and unreliable estimate of the scaling exponents can be obtained. Applications to observed and synthetic rainfall data are given and discussed.

NG41B MCC: Level 1 Thursday 0830h

From Microscale to Macroscale: Models for Material Damage Mechanics and Earth System Dynamics and Their Relation to Seismicity and Earthquakes II Posters

(joint with S, T, AE, GC, MR)

Presiding: **J B Rundle,** University of California, Davis**; R Shcherbakov,** University of California, Davis**; D L Turcotte,** University of California, Davis

NG41B-0057 0830h INVITED POSTER

VISCO-ELASTIC DAMAGE RHEOLOGY MODEL: THEORY AND EXPERIMENTAL TESTS

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We present a visco-elastic damage rheology model that provides a generalization of Maxwell visco-elasticity to a non-linear continuum mechanics framework incorporating material degradation and recovery, transition from stable to unstable fracturing, and gradual accumulation of non-reversible deformation. The model is a further development to the damage rheology framework of Lyakhovsky et al. [1997] for evolving effective elasticity. Our approach provides a quantitative treatment for macroscopic effects of evolving distributed cracking with local density represented by an intensive state variable. This assumes a system with a large number of cracks where one can define a smooth distribution over a representative volume that is much larger than the size of a typical crack and much smaller than the size of the entire domain. The present formulation, based on thermodynamic principles, leads to a system of kinetic equations for the evolution of damage. We introduce an effective viscosity inversely proportional to the rate of damage increase to account for gradual accumulation of irreversible deformation due to dissipative processes. A proposed power-law relation between the damage variable and elastic moduli leads to a non-linear coupling between rate of damage evolution and the damage variable itself. This allows the model to reproduce a transition from stable to unstable fracturing of brittle rocks and hysteresis phenomena including the Kaiser effect. Analytical solutions and 3-D numerical simulations based on the model formulation account for the main features of rock behavior under large strain. Model parameters are constrained using triaxial laboratory experiments with low porosity Westerly granite and high porosity Berea sandstone samples. During three of the laboratory experiments, small loading-unloading cycles were carried out. Throughout all of these cycles, acoustic emissions were not recorded and irreversible strain was not accumulated. These and other features of the laboratory data are compatible with the model predictions and provide experimental support for the model.

NG41B-0058 0830h POSTER

A Dynamic Model of Scratch Tests by a Conical Indenter and its Implication for Velocity-dependent Adhesive Friction — An Interpretation of the Direct Effect of Dieterich-Ruina's Friction law —

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It is a well known phenomenon in wear study that an indenter is in down-and-up motion at the beginning of a scratch process. A dynamic model was constructed to explain the motion of the indenter. The model assumes that a flow stress of indented material acts perpendicularly to the indenter surface and an adhesive friction also acts tangentially when the indenter is in motion. The movement of the indenter produces a groove on the indented material and a pile (ridges on both sides and a prow in front) is created around the indenter, the effect of which is taken into account in the model. We performed a series of scratch tests by a conical diamond indenter on aluminum, copper and brass surfaces with a constant horizontal velocity ranging from 0.1 to 1000 μm/s. The experimental result shows that the bulk friction force is proportional to the logarithm of the horizontal velocity. The comparison of the experimental results with the simulation by the model requires introducing a dynamic flow pressure P_d for the indenter in motion. P_d is estimated to be 1.2 - 1.3 times larger than the static flow pressure P_s (which is obtained by a static indentation). It was found that the ratio P_d/P_s plays an important role in scratch tests: the ratio determines the initial sinking angle and hence the overall locus of the indenter. Further we found that the velocity-dependent friction observed in the experiments must be attributed to the coefficient of adhesive friction μ, which increases with velocity in a logarithmic manner. This fact suggests that the direct effect in the Dieterich-Ruina's constitutive friction law should be attributed to the velocity-dependent adhesive friction.

NG41B-0059 0830h INVITED POSTER

Spatial and temporal distributions of shear wave anisotropy and analysis of repeating earthquakes in the Karadere-Duzce branch of the north Anatolian fault

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We analyze crustal shear wave anisotropy from seismograms recorded by a PASSCAL seismic network deployed along and around the Karadere-Duzce branch of the north Anatolian fault for about 6 month, starting a week after the August 17, 1999, Mw7.4 Izmit earthquake. On November 12, 1999, the Mw7.2 Duzce earthquake started and propagated eastward from the Karadere-Duzce fault. Our temporary seismic network straddles the eastern end of the Izmit earthquake and the western end of the Duzce earthquake and recorded about 26000 earthquakes. We use the technique of Silver and Chan (1991) to estimate the fast polarization direction and delay time of the splitted shear waves. Stations at several km off the fault generally have fast polarization direction sub-parallel to the regional tectonic stress direction (roughly NW-SE). Stations within several hundred meters of the surface rupture show polarization directions that are sub-parallel to and change with the local fault strike. This suggests stress-induced cracks aligned by nearby faulting during a major earthquake as a source for the observed anisotropy for these stations. The time delay shows no systematic relationship with either focal depth or hypocentral distance. This indicates that seismic anisotropy in our study area is confined primarily to the top 3-4 km of the shallow crust. In an effort to detect temporal changes associated with the occurrence of the Izmit and Duzce earthquakes, we perform analysis of shear wave splitting of repeating earthquakes in our study area. Repeating earthquakes are identified using an equivalency class algorithm (e.g., Aster and Scott, 1993). The similarity measure is based on the mean cross-correlation values of all waveforms between event pairs. The waveform cross-correlation is performed over a time window of 1 sec before and 5 sec after the P arrivals. Our data set can be divided to fault zone events that are in the vicinity of the Karadere-Duzce branch of the Izmit rupture zone and the reminder regional events (located around Stations CH and BV). Depending on the similarity criteria, approximately 15-40% of events in the fault zone set belong to similar event clusters. The percentage is about 8-20% for the regional events off the fault. The analysis done so far does not show a clear precursory change before the Duzce earthquake. However, splitting measurements from several repeating earthquake clusters indicate slight changes in both fast polarization direction and delay time before and after the Duzce earthquake. The observed temporal changes might be caused by the increasing of the crack density due to the static stress change or dynamic shaking effect associated with the Duzce earthquake. Updated results will be presented in the meeting.

NG41B-0060 0830h POSTER

Generation of fault damage zone: Modeling and simulation of dynamic off-fault damage

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Based on observations of fault rocks, the typical structure of natural fault zone is constituted by a very localized slip plane and a widely distributed damage zone, fractured by shear deformation, around the slip plane in the direction of the fault normal. However, the generation process of the damage zone is still an open question. On the seismological viewpoint, investigation of the effect of the damage zone on a dynamic rupture process is important for the understanding of the complexity of earthquakes. In the present study, we consider the generation of fault damage zone associated with a dynamic rupture. We assume an in-plane shear fault called main fault in a 2-D homogeneous isotropic elastic medium. We also assume a large number of preexisting micro weak-planes around the main fault as the model of fractures in the earth's crust; shear ruptures are permitted to trigger on them. As the initial phase of our study, we simply assume that the ruptures propagate only on the pre-existing planar weak-planes that are parallel to each other. In our result, we observe that width of the zone containing the triggered micro weak-planes becomes wider as the main fault propagates; triggering of the micro ruptures propagates by S-wave speed b caused by the wave radiation from the main fault. These micro ruptures are considered to be the fault damage zone in natural fault cases. We also observed that an accelerated rupture on the main fault decelerated in the initial stage of the dynamic propagation, and then the rupture velocity of the reaccelerated propagation does not reach the limiting speed that is Rayleigh-wave speed (0.92b in our case). These decelerations are caused by negative interactions due to a stress shadow of the off-fault micro ruptures. In conventional macroscopic fault models, the thickness of faults is neglected. In such a case, the ruptures are aligned in coplanar and only positive interactions, which accelerate the each rupture, are affected. However, as shown in the present microscopic study, when we consider the thickness on the fault as the fault damage zone, the negative interactions are affected, which are never appeared in the macroscopic modeling and are important to the rupture process.

URL: http://www.eri.u-tokyo.ac.jp/ando/agu

NG41B-0061 0830h POSTER

Mean-field studies of a slider-block model with noise

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We have studied a simple model of earthquake faults based on the cellular automaton version of the slider-block model. The model is represented by the two-dimensional array of massless blocks connected by springs to its neighbors and the loader plate. Stress is introduced to the system by moving the loader plate with infinitesimally low velocity and stress is dissipated by the toppling sites. The residual value of the toppled site is a random variable with prescribed noise amplitude. The model described is one of the variants of the Rundle-Jackson-Brown (RJB) model. We conduct systematic studies of noise dependence of our model in mean and near mean-field. In mean-field every site interacts with all other sites of the grid, that is the system has infinite range of interaction, while in the near mean-field case the range of interaction is large but final. Theoretical and numerical results presented here show that the distribution of avalanches in this model exhibits strong deviations from the expected simple power law distribution. The value of the noise parameter effectively restricts the evolution of the system in the phase-space, controlling the transition from exact periodic to totally chaotic behavior. Exact, scaling and numerical results are shown and possible relations to real earthquakes are discussed.

NG41B-0062 0830h POSTER

Unified Scaling Law for Earthquakes: Implications for Hazard Assessment

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The confirmed multiplicative scaling of earthquakes changes the traditional view on the recurrence of catastrophic events and helps estimating seismic hazard in an adequate way. The evident patterns of distributed seismicity are apparently scalable according to the Unified Law that generalizes Gutenberg-Richter recurrence relation by accounting for the fractal nature of faulting. The results of the systematic global analysis of the local earthquake size distribution imply that (i) the recurrence of earthquakes in a seismic region, for a wide range of magnitudes and sizes, can be characterized with the following law: Log N(M,L) = A - B (M - 5) + C Log L, where N(M,L) is the expected annual number of earthquakes of magnitude M within an area of liner size L; (ii) for a wide range of control parameter A from under -1.0 to above 0.5, which value determines the average rate of earthquakes that accordingly differs by a factor of 30 or more, the balance between magnitude ranges, B, resides mainly from 0.6 to 1.1, while the fractal dimension of the local seismic prone setting, C, changes from under 1 to 1.4 and larger; (iii) any estimate of earthquake recurrence rate depends on the size of the territory that is used for averaging and, therefore, may differ dramatically if rescaled to the area of interest in a traditional way. For example, the recurrence of a large magnitude earthquake at Los Angeles, an area with L about 40 km, would perhaps be determined from a catalog of the entire southern California, an area with L about 400 km. The estimates for Los Angeles, using SCSN data, 1984-2001, give C = 1.21 and, therefore, imply a traditional assessment of the recurrence in such a case being underestimated by at least a factor of 6. Using the US GS/NEIC Global Hypocenters' Data Base, 1964-2001, and a robust box-counting algorithm, we managed to map values of A, B, and C in every place on the Earth, where the catalog of shallow earthquakes permitted a reliable estimation.

NG41B-0063 0830h POSTER

Numerical insights into 3-D microprocesses responsible for macroscopic granular shear

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Earthquakes commonly occur on faults containing significant accumulations of gouge therefore investigating the processes operating in granular material under shear is extremely relevant to earthquake and fault mechanics. We present a 3-D numerical model of a granular layer subjected to shear in which grains are represented by individual spheres interacting at points of contact. The 3-D models exhibit macro friction levels notably higher than corresponding 2-D models and values that approach those of recent laboratory experiments on spherical beads. The 3-D models and laboratory studies also show much smaller fluctuations in friction than the corresponding 2-D simulations. The numerical model enables an investigation of the microprocesses that produce this observed macro behavior including visualization of grain sliding, grain rolling and the evolution of transient force chains. In 3-D, an extra dimension of grain interaction reduces the ability of the grains to accommodate strain through rolling as is observed in 2-D resulting in an increase in the mean macro friction level. It is shown that fluctuations in friction are directly related to grain reorganization normal to shear. In 3-D, these fluctuations are reduced due to significant particle motion in the third dimension, leading to a steady frictional sliding curve. Since these geometrical fluctuations are small compared with 2-D models, our 3-D simulation offers potential to investigate small amplitude but extremely important second order rate and state friction effects that fundamentally control the strength and stability of fault zones.

NG41B-0064 0830h POSTER

Model of Dynamical Slip Events and the Generation of Propagating Slip Pulses

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We describe a new model for the simulation of extended dynamical slip events and for the rapid calculation of the Statistical properties of repeated model seismicity events. The fault model generates 2-D in-plane dynamical ruptures. The discretization involves first- and second-nearest neighbors, is of Burridge-Knopoff type and is isotropic in both compression and shear properties. All rupture events are causal and numerical oscillations in slip velocity at crack tips due to discretization are minimized. The computational speed is fast in comparison with 3-D models; in sample tests of statistical compilations, 10^5 events can be simulated in about 1.5 hours on a contemporary PC. We use the model to study growth and healing of individual faults in an effort to understand the formation of propagating slip pulses. We consider an elongated rectangular model fault in which the upper surface is free and the lower boundary is rigid. The rupture velocities of fractures with homogeneous stress drop equal to the strength, are the P-wave velocity in the direction of the prestress and the S-wave velocity in the perpendicular direction. Two mechanisms for generation of isolated rupture pulses have been proposed, which are 1) an increase in the dynamical friction with decelerating slip and 2) encounter with elongated regions of large difference between the threshold fracture stress and the prestress. We have identified a third mechanism which is that of a velocity dependent friction that operates equally on the phases of increasing and decreasing slip velocities and has a characteristic length scale. This frictional mechanism is a parameterization of the absorption of near-fault fracture energy in large earthquakes during the formation of aftershock zones. Pulses develop due to the influence of stress waves reflected from the rigid bottom boundary of the seismogenic slab. In general, crack fracture speeds are controlled by excess of strength over stress drop; if it is too large, the crack stops. For given boundary conditions, slip velocities are higher where prestresses are higher. Isolated slip pulses have small static slips and rise times for small thicknesses of the seismogenic zone and for large values of the near-fault absorption.

NG41B-0065 0830h INVITED POSTER

Systematic Analysis of Shear-Wave Splitting in the Aftershock Zone of the 1999 Chi-Chi Earthquake: Evidence for Shallow Crustal Anisotropy and Lack of Temporal Variations

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We analyze shear-wave splitting (SWS) in a high-quality waveform data set recorded at surface and downhole (0.2 km) seismometers in a region around the 1999 M_W 7.6 Chi-Chi, Taiwan, earthquake sequence. The data set was generated by events before, during and after the mainshock. The purpose is to investigate the spatial distribution of stress-induced crustal anisotropy and its possible temporal evolution in relation to the occurrence of large earthquakes. Results from downhole records show a stable polarization direction of the fast shear wave which matches well the local GPS velocity field. A slightly different polarization direction of the fast shear wave is obtained from surface data. This suggests a possible anisotropy change between the top 0.2 km structure and the deeper section of the crust. Measured time delays below the downhole station have an average value 0.16 sec without systematic changes for sources from about 8 km to 20 km in depth. Estimates of time delays in the top 0.2 km of the crust based on shear waves reflected from the free surface give a constant 0.04 sec. These two types of measurements and an S-velocity model indicate that the crustal anisotropy in the region is dominated by the top 2 - 3 km. The measured polarization directions and time delays give essentially constant values over the study period in the region adjacent to the Chi-Chi earthquake and within 10 km to the epicentral region of its two large M 6.0 aftershocks. Analysis of SWS in waveforms produced by earthquake multiplets confirms further the lack of temporal variations. This raises doubts on the usefulness of SWS measurements for earthquake forecasting.

NG41C MCC: Level 1 Thursday 0830h

Critical Point Theory and Space-Time Pattern Formation in Precursory Seismicity II Posters *(joint with S, T)*

Presiding: **K Tiampo,** University of Western Ontario**; M Anghel,** Computer and Computational Sciences Division

NG41C-0066 0830h POSTER

An Observational Test of the Stress Recovery Model for Seismicity Preceding Landers.

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We test the Bowman and King [GRL, 2001] "stress recovery" model by examining the pattern of strain released by small events prior to the 1992 Landers earthquake. The stress recovery (SR) model was developed to explain observations of accelerating seismicity preceding large earthquakes. The model proposes that the accelerating seismicity sequences result from tectonic loading that erodes the stress shadow from a prior event and increases elastic strain across the locked portion of the main fault. We test the prediction of the SR model that the pattern of strain released by the precursory seismicity should correlate with the strain building across the locked portion of the main fault. Our results show correlation of the seismicity-based strain field with the pre-Landers model strain field, and weak anti-correlation with the post-Landers model strain field. The correlation and anti-correlation are optimized when an approximately N-S compressive stress of 8 to 20 bars is added to the model.

NG41C-0067 0830h POSTER

Forecasting Earthquakes in Southern California Using the Stress Accumulation Method

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Many large earthquakes are preceded by a regional increase in seismic energy release. This phenomenon, called "accelerating moment release" (AMR), is due primarily to an increase in the number of intermediate-size events in a region surrounding the mainshock. Bowman and King (GRL, 2001) and King and Bowman (JGR, 2003) have described a technique for calculating an approximate geologically-constrained loading model that can be used to define regions of AMR before a large earthquake. While this method has been used to search for AMR before large earthquakes in many locations, most of these observations are "postdictions" in the sense that the time, location, and magnitude of the main event were known and used as parameters in determining the region of precursory activity. With sufficient knowledge of the regional tectonics, it should be possible to estimate the likelihood of earthquake rupture scenarios by searching for AMR related to stress accumulation on specific faults. Here we show a preliminary attempt to use AMR to forecast strike-slip earthquakes on specific faults in southern California. The false-alarm rate for this method is also estimated using synthetic earthquake catalogs.

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Short-Term Premonitory Rise of the Earthquake Correlation Range

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This study explores the possibility of short-term earthquake prediction, with the lead-time months to weeks. Prediction considered is based on the evolution of seismicity preceding a strong earthquake. We have found the following two-steps sequence: 1) Within years before a strong earthquake — rise of seismic activity, rise of earthquakes clustering in space and time, and specific transformations of Gutenberg-Richter relation. 2) Within weeks before that earthquake — rise of earthquakes correlation range. These phenomena have been captured by premonitory seismicity patterns previously established in the studies of observed and theoretically modeled seismicity. We have used the same formal definitions of premonitory patterns as in these studies. Change of their scaling allowed us to narrow down the time and territory within which a strong earthquake is predicted. Summing up these findings we formulate a hypothetical short-term prediction algorithm. Territorial accuracy of prediction is considerably increased by reverse order of the analysis: First, we determine the chains of earthquakes exhibiting short-term rise of the earthquakes correlation range. Then, we check for each chain whether the patterns from stage 1 did emerge in its vicinity. If the answer is yes, algorithm declares a short-term alarm. Suggested algorithm was applied retrospectively to 27 large earthquakes: 18 in Japan (M = 7) and 9 in California (M = 6.4). The results are highly encouraging. However the only decisive test will be advance prediction. In conclusion we outline the possible physical interpretation of the suggested algorithm.